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THE NORTH AMERICAN PARASITIC WASPS OF THE
GENUS *TETRASTICHUS*—A CONTRIBUTION TO BIO-
LOGICAL CONTROL OF INSECT PESTS

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THE genus *Tetrastichus* Haliday (Hymenoptera: Eulophidae) includes a large number of species of minute chalcid-flies. These may be either primary parasites or hyperparasites, and they attack a wide variety of hosts (see host list hereinafter), including such destructive pests as the Hessian fly and the cotton boll weevil and many kinds of thrips, aphids, midges, leaf miners, scales, tent caterpillars, borers, roaches, beetles, and gall-makers injurious to agriculture, horticulture, and forestry. They have been reared from the eggs, larvae, and pupae of other insects, as well as from many plant galls. Economically, therefore, this is an important group of the Chalcidoidea, and a thorough understanding of its species and relationships is desirable. Twenty-three species are herein described for the first time.

From a taxonomic standpoint this genus is a difficult one for several reasons. The species are so small that very good microscope equipment is needed for studying them. Specimens are only lightly sclerotized, so that they almost invariably shrivel badly in drying; this tends to conceal or distort their morphological characters. It has not, however, been possible satisfactorily to study specimens preserved in alcohol or on slides. There is, furthermore, a great lack of good, definite morphological characters for the separation of species

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in this genus. Color differences alone are seldom reliable for the separation of species, but, in some cases, only color characters could be found.

The males of *Tetrastichus* often exhibit good differences in the antennae and genitalia, but males are so rare that a useful classification cannot be based on them. Females of a given species are generally ten or more times as numerous as are the males; in one-third of the species in this genus males are unknown, and in some forms males apparently do not exist. Finally, the study of the species in this genus is greatly impeded by the very poor condition of many of the types.

A. B. Gahan, of the U. S. Bureau of Entomology and Plant Quarantine, has taken an active interest in the completion of this synopsis, and many of the decisions as to specific limits, validity of characters, and synonymy have been made in consultation with him. He also generously allowed me to make full use of his notes and a manuscript key to part of the genus; the latter contained several valuable characters for the segregation of species.

In 1843, Haliday¹ described the genus *Tetrastichus* in a paper giving his somewhat preliminary classification of the chalcid-flies. The genus is monobasic, with *Cirrospilus attalus* Walker clearly indicated as the type. Walker apparently accepted this generic segregate at once, as he published the description of a new species in *Tetrastichus* the following year,² and, shortly thereafter, transferred many of his species, previously described in *Cirrospilus*, to *Tetrastichus*.³ Walker,⁴ also, treated *Aprostocetus* Westwood as a synonym of *Tetrastichus*, but that, according to present-day standards of taxonomic procedure, would be impossible, as *Aprostocetus* is the older of the two names.

Foerster, in 1856,⁵ published his comprehensive classification of the chalcids and acknowledged the fact that it was based largely on the works of Haliday and Walker. Foerster, however, distributed the genera of chalcid-flies among more than 20 families. *Tetrastichus* was made the type genus for one of these families. The genera *Triphasius* Foerster, *Anozus* Foerster, *Pteroptrix* Westwood, *Trichaporus* Foerster, *Ceranisis* Walker, *Baryscapus* Foerster, *Hyperteles* Foerster, and *Tetrastichus* Haliday were grouped together to form the family Tetrastichoidae.⁶ In his discussion of the genus *Tetrastichus*,⁷

¹ Trans. Ent. Soc. London, vol. 3, p. 297, 1843.

² Ann. Mag. Nat. Hist., vol. 14, p. 17, 1844.

³ List of the specimens of hymenopterous insects in the collection of the British Museum, Chalcididae, 237 pp. in 2 vols., London, 1846-1848.

⁴ Loc. cit., p. 78.

⁵ Hymenopterologische Studien, vol. 2, 152 pp., Aachen, 1856.

⁶ Loc. cit., p. 83.

⁷ Loc. cit., p. 86.

Foerster stated that he considered Walker to have been correct in combining *Aprostocetus* and *Tetrastichus* but that in the future if the species with an elongate ovipositor were segregated generically they should be placed under the name *Aprostocetus*, with *Lonchentedon* Ratzeburg as a generic synonym.

When Walker published his final classification of the chalcid-flies,⁸ he treated the genera of the family Tetrastichidae briefly, but his classification differs very little from Foerster's. Walker, even at that comparatively late date, continued to regard *Aprostocetus* as a synonym of *Tetrastichus*,⁹ although observance of the right of priority had become quite general by that time.

In 1878, Thomson¹⁰ published keys and descriptions for the Scandinavian species of *Tetrastichus*, listed *Aprostocetus* Westwood and *Lonchentedon* and *Geniocerus* Ratzeburg as generic synonyms, and transferred a number of species from *Eulophus* and *Entedon* to *Tetrastichus*.

Howard, a few years later, keyed out the genera of the chalcids but did not modify the concept of the genus *Tetrastichus* prevailing in the works of European authors.¹¹ When Ashmead published his classification of the suprageneric categories of his superfamily Chalcidoidea,¹² he considered Foerster's family Tetrastichoidae (or Walker's Tetrastichidae) as the subfamily Tetrastichinae of the Eulophidae. In his classification of the chalcid-flies down to genera, Ashmead included 13 genera in the Tetrastichinae.¹³ He considered *Tetrastichus* and *Aprostocetus* to be distinct, and listed *Geniocerus* and *Trichoceras* Ratzeburg as synonyms of the former. He cited *Eulophus miser* Nees as the genotype of *Tetrastichus*, apparently because of the fact that Dalla Torre¹⁴ had listed *Cirrospilus attalus* as a synonym of *Eulophus miser*.

Ashmead grouped *Melittobia* Westwood, *Tetrastichodes* Ashmead, *Trichaporus* Foerster, *Hyperteles* Foerster, *Cyrolasia* Foerster, *Syntomosphyrum* Foerster, *Ceraninus* Walker, *Baryscapus* Foerster, *Aprostocetus* Westwood, *Crataepus* Foerster, and *Pentastichus* Ashmead with *Tetrastichus* in the tribe Tetrastichini and, making a tribe Ceratoneurini for the genus *Ceratoneura* Ashmead, placed these two tribes in the subfamily Tetrastichinae. Five years later, Schmiedeknecht¹⁵ used Ashmead's classification almost without change but pointed out that the genus *Oomyzus* Rondani is a synonym of *Tetrastichus*.

⁸ Notes on Chalcididae, 129 pp. in 7 pts., London, 1871-1872.

⁹ *Loc. cit.*, p. 113.

¹⁰ Hymenoptera Scandinaviae, vol. 5, p. 278, 1878.

¹¹ Ent. Amer., vol. 2, p. 100, 1886.

¹² Proc. Ent. Soc. Washington, vol. 4, p. 249, 1897.

¹³ Mem. Carnegie Mus., vol. 1, p. 348, 1904.

¹⁴ Catalogus hymenopterorum, vol. 5, p. 18, 1898.

¹⁵ Genera Insectorum, fasc. 97, p. 471, 1909.

In 1913, Kurdjumov¹⁶ published the results of his extensive researches on *Tetrastichus* and its allies. His conclusions were based on a careful study of almost all the types involved, so these conclusions may be accepted without question. Kurdjumov showed that *Trichaporus* is a synonym of *Astichus* Foerster (belonging in the subfamily Entedoninae), and *Gyrolasia* is the same as *Pteroptria* Westwood (a member of the subfamily Aphelininae). He also considered *Syntomosphyrum*, *Ceranisus*, and *Baryscapus* to be synonyms of *Tetrastichus*. He resurrected the genus *Geniocerus*, however, for those species, formerly placed in *Tetrastichus*, which have more than one dorsal bristle on the submarginal vein of the forewing, and restricted *Tetrastichus* to those species with but one dorsal bristle. He used the name *Aprostocetus* for those species having a long, exerted ovipositor. Kurdjumov confirmed the fact that *Cirrospilus attalus* is a synonym of *Eulophus miser*, and, since he presumably saw the types of both species, this synonymy may be accepted without further question.

The following year, Gahan published a key to the few Nearctic species then known to him that would be referable to the genus *Tetrastichus* as defined by Kurdjumov.¹⁷ Crawford¹⁸ was of the opinion that Kurdjumov's definition of *Tetrastichus* and *Geniocerus* was unsatisfactory but that nothing better was available. Since that time, the genus *Geniocerus* has been used by few authors, but, for the rest, Kurdjumov's findings have been quite generally followed.

Beginning in 1912 and for several years following, A. A. Girault published descriptions of numerous new genera and species of Tetrastichinae, many of which must be considered in treating *Tetrastichus* in the Nearctic region. Girault based his work almost entirely on Ashmead's classification. Many of Girault's generic names were proposed originally for Australian species, but a large number of these genera were used by him when he later described species from North America. As authentic material of the genotypes of these genera is not available, it is difficult to form reliable conclusions regarding their validity. A study of the North American species that he placed in these genera leads to the conclusion that many of them should be considered as synonyms of *Tetrastichus*, but study of the genotypes themselves very well might show that at least some of them should be retained for Australian and other non-Nearctic species. Some of Girault's genera, however, can safely be synonymized after studying material he referred to them; others must be left in abeyance for the time being.

Girault was not always consistent in his treatment of his genera. For example, he described the genus *Aprostocerotoides* in his first ac-

¹⁶ Russ. Ent. Obozr. (Rev. Russe Ent.), vol. 13, p. 242, 1913.

¹⁷ Proc. U. S. Nat. Mus., vol. 48, p. 166, 1914.

¹⁸ Proc. U. S. Nat. Mus., vol. 48, p. 584, 1915.

count of the Eulophidae of Australia,¹⁹ but in the supplement to this work he listed this genus as a synonym of his *Trichaporoidella*.²⁰ Later he evidently decided that the two genera were not the same, as he placed one of his new species from the United States²¹ in the genus *Aprostoceroloides*. The characters given in the original descriptions of *Aprostoceroloides* and *Trichaporoidella* would not suggest that they are the same, and my opinion is that *Aprostoceroloides* is a synonym of *Tetrastichus*, while *Trichaporoidella* is more than likely the same as *Syntomosphyrum*. It also might fairly be said that it is often difficult to reconcile Girault's generic assignments of his North American species with the characters he gave for those genera when he described them.

My own conclusions regarding the limitation of *Tetrastichus* and its related genera differ little from those of Kurdjumov. I do not, however, agree with him that *Syntomosphyrum* is a synonym of *Tetrastichus*, as I consider the two groups recognizably distinct. Furthermore, the use of the name *Geniocerus* seems unnecessary; the species referred to that genus may well be placed in *Tetrastichus*. The genus *Ceraninus*, as identified by Ashmead (and apparently by Kurdjumov as well), is not the same as Walker's genus as originally described. *Ceraninus* Ashmead, not Walker, is undoubtedly the same as *Tetrastichus*, but *Ceraninus* Walker (having but two funicle segments) is close to *Pentastichus* Ashmead.

The true genus *Hyperteles* has not, so far, been found to occur in North America. Most of the Nearctic species which have been described in *Hyperteles*, however, belong in *Tetrastichus*. Although I have transferred a number of species from *Ootetrastichus* Perkins to *Tetrastichus*, I do not consider *Ootetrastichus* a synonym of *Tetrastichus*. The genera *Thymus*²² and *Prothymus*,²³ described by Girault, and related to *Tetrastichus*, seem to be recognizably distinct, although the available material of them is in extremely poor condition.

Genus TETRASTICHUS Haliday

- Tetrastichus* HALIDAY, Trans. Ent. Soc. London, vol. 3, p. 297, 1843.—KURDJUMOV, Russ. Ent. Obozr. (Rev. Russe Ent.), vol. 13, p. 253, 1913.—GAHAN, Proc. U. S. Nat. Mus., vol. 48, p. 166, 1914. (Type, *Cirrospilus attalus* Walker.)
Trichoceras RATZBURG, Die Ichneumonen der Forstinsecten . . . , vol. 2, p. 171, 1848. (Type, *Trichoceras erythrophthalmus* Ratzeburg.)
Geniocerus RATZBURG, Die Ichneumonen der Forstinsecten . . . , vol. 2, p. 175, 1848. (Proposed unnecessarily for *Trichoceras* Ratzeburg, 1848, which was thought to be preoccupied by *Trichocera* Meigen, 1803.)

¹⁹ Mem. Queensland Mus., vol. 2, p. 243, 1913.

²⁰ Mem. Queensland Mus., vol. 3, p. 229, 1915.

²¹ Chalcidoidea nova Marilandensis, pt. 2, p. 2, 1917.

²² Can. Ent., vol. 48, p. 113, 1916.

²³ New chalcid flies, p. 1, 1917.

- Baryscapus* FOERSTER, Hymenopterologische Studien, vol. 2, p. 84, 1856. (Type, *Baryscapus centricolae* Ashmead.)
- Oomyzus* RONDANI, Bull. Agr. Comm. Parma, vol. 3, p. 140, 1870. (Type, *Oomyzus gallerucae* Rondani.)
- Tetrastichodes* ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 203, 1887. (Type, *Tetrastichodes floridanus* Ashmead.)
- Ceraniscus* ASHMEAD (not Walker), Mem. Carnegie Mus., vol. 1, p. 349, 350, 1904.
- Ncotetrastichus* PERKINS, Bull. Hawaiian Sugar Planters' Assoc. Exp. Stat., Ent. Ser., vol. 10, p. 14, 1912. (Type, *Ncotetrastichus minus* Perkins.) (New synonymy.)
- Epitetrastichus* GIRAULT, Mem. Queensland Mus., vol. 2, p. 205, 1913. (Type, *Epitetrastichus speciosissimus* Girault.) (New synonymy.)
- Ncomphaloidella* GIRAULT, Trans. Roy. Soc. South Australia, vol. 37, p. 69, 1913. (Type, *Ncomphaloidella fasciiventris* Girault.) (New synonymy.)
- Ncotetrastichodes* GIRAULT, Mem. Queensland Mus., vol. 2, p. 228, 1913. (Type, *Neotetrastichodes flavus* Girault.) (New synonymy.)
- Epomphaloides* GIRAULT, Arch. für Naturg., vol. 79A, No. 6, p. 49, 1913. (Type, *Epomphaloides flavus* Girault.) (New synonymy.)
- Aprostoceroioides* GIRAULT, Mem. Queensland Mus., vol. 2, p. 243, 1913. (Type, *Aprostoceroioides speciosus* Girault.) (New synonymy.)
- Blattotetrastichus* GIRAULT, Ent. News, vol. 28, p. 257, 1917. (Type, *Entedon hagenowii* Ratzeburg.) (New synonymy.)

The following combination of characters will differentiate the members of the genus *Tetrastichus* from all other members of the superfamily Chalcidoidea:

Margin of clypeus with a pair of toothlike projections (fig. 17, *a*); antennae never inserted at or immediately dorsad of clypeal margin; maxillary and labial palps each composed of one segment; mandibles each with three teeth; female antenna with three funicle segments, male with four, club in both sexes composed of three segments, terminal two often more or less fused, club always with a minute terminal style; eyes with sparse, short hairs; pronotum narrow, transverse (figs. 18, 19); front and middle tibiae slender; all tarsi with four segments; front wing with a break where Rs diverges from the stem of R, submarginal vein of front wing with from one to seven dorsal bristles; marginal vein always longer than stigmal vein, postmarginal vein wanting, no trace remaining of vein M; axillae produced anteriorly far in advance of tegulae; mesoscutellum with two longitudinal, dorsal grooves (fig. 18); hindwing with three hamuli (fig. 20, *f*); abdomen often with a rudimentary petiole (fig. 21, *b*); but never distinctly petiolate; ovipositor not markedly exerted (fig. 21, *g-i*).

KEY TO SPECIES

- Ovipositor sheaths short, thickened, and somewhat flattened (fig. 21, *g*)----- 2
Ovipositor sheaths elongate, more slender, as in fig. 21, *h, i*----- 3
- Gaster nearly circular in outline, ovipositor sheaths densely covered with short, stout setae (fig. 21, *g*)----- *chrysopae* (Crawford) (p. 525)
Gaster fully twice as long as broad, sheaths with only three or four weak setae----- *thripophonus* Waterston (p. 525)
- Gaster as long as thorax; body very dark brown or black, noniridescent; submarginal vein of forewing with one dorsal bristle; mesopraescutum with one row of bristles at each lateral margin, this row consisting of only three

or four long bristles; apices of ovipositor sheaths usually just reaching apex of abdomen, occasionally not quite reaching apex.

johnsoni Ashmead (p. 526)

- Not having that combination of characters..... 4
4. Apices of sheaths and ovipositor, when in repose, not reaching apex of abdomen, as in fig. 21, *i*..... 5
- Apices of sheaths and ovipositor, when in repose, reaching or slightly exceeding apex of abdomen, as in fig. 21, *h*..... 11
5. Marginal and stigmal veins of forewing almost equal in length, the latter nearly three-quarters as long as the former.... *lissus*, new species (p. 527)
- Marginal vein at least twice as long as stigmal vein..... 6
6. Mesopraescutum with two or three rows of bristles at each lateral margin; dorsal surface of thorax dull, and with dense, well-marked scalelike reticulations..... *ichthus*, new species (p. 528)
- Mesopraescutum with only one row of bristles at each lateral margin; dorsal surface of thorax rather shining, and with shallow scalelike reticulations, or lacking such sculpture entirely..... 7
7. Thorax black or brown, noniridescent..... 8
- Thorax bright, iridescent green or blue-green..... 10
8. Metatibiae partly dark brown or black..... *melanis*, new species (p. 529)
- Metatibiae entirely light yellow or white..... 9
9. Femora partly brown; stigmal vein of forewing short, subsessile, as in fig. 20, *b*)..... *brevistigma* Gahan (p. 530)
- Femora entirely light yellow or white; stigmal vein of forewing long, as in fig. 20, *a*..... *pandora*, new species (p. 530)
10. Antennal club twice as long as third funicle segment; third funicle segment nearly twice as long as broad; scape almost always yellow; mandibles and mouth opening reduced in size (fig. 17, *a*)... *hylotomae* (Ashmead) (p. 531)
- Antennal club two and one-half times as long as third funicle segment; third funicle segment only slightly longer than broad; scape almost always brown; mandibles and mouth opening large (fig. 17, *b*)... *asparagi* Crawford (p. 532)
11. Mesopraescutum with only one bristle at each lateral margin (fig. 18, *d, e*)... 12
- 18, *d, e*)..... 12
- Mesopraescutum with two or more bristles at each lateral margin, or with one to several rows of bristles at each lateral margin, or with bristles distributed over entire sclerite, as in figs. 17, *b, c*; 18, *a-c*..... 19
12. Anterior pair of scutellar bristles longer than posterior pair (fig. 18, *e*); thorax black or brown, marked with yellow, sometimes almost entirely black..... *flora* (Girault) (p. 533)
- All scutellar bristles equal in length or posterior pair longer; thorax never yellow and brown; either iridescent blue or green, or entirely dark brown or black..... 13
13. Thorax iridescent green..... *hillmeadia* (Girault) (p. 534)
- Thorax very dark brown or black, noniridescent..... 14
14. Gaster entirely dark brown, or mostly dark brown with base tan. *solidaginis*, new species (p. 534)
- Gaster partly or almost entirely white..... 15
15. Abdomen almost entirely white; brown only along dorsolateral margins... 16
- Abdomen white only at base..... 18
16. First and second funicle segments equal in length. *pulchriventris* (Girault) (p. 535)
- Second funicle segment longer than first..... 17
17. All femora white..... *ulysses* (Girault) (p. 536)
- Front and mid femora partly brown... *semilongifasciatus* (Girault) (p. 536)

18. Length of ocellocular line nearly twice as great as maximum diameter of lateral ocellus; propodeum long, its mesal length one-third as great as length of mesoscutellum; all femora light yellow or white; male antenna with long bristles, as in fig. 16, *l*----- *ainsliei* Gahan (p. 537)
Length of ocellocular line only slightly greater than maximum diameter of lateral ocellus; propodeum shorter, its mesal length only one-sixth as great as length of mesoscutellum; front and middle femora partly tan; male antenna with short bristles, as in fig. 16, *j*----- *whitmani* (Girault) (p. 538)
19. Mesopraescutum with numerous, slightly irregular longitudinal rugae on meson, and whole dorsum of thorax with extremely coarse sculpture.
gelastus, new species (p. 539)
Mesopraescutum without longitudinal rugae on meson; dorsum of thorax not so coarsely sculptured----- 20
20. Body very dark, iridescent blue or blue-green; propodeum extremely short, its mesal length only one-fifth as great as length of mesoscutellum; abdomen long and narrow, at most only one-half as wide as maximum width of thorax; base of gaster broadly joined to propodeum; propodeal spiracles minute, almost round and nearly touching anterior margin of propodeum.
malacosomae Girault (p. 539)
Not having that combination of characters----- 21
21. Submarginal vein of forewing with only one dorsal bristle, as in fig. 20, *a-c*----- 22
Submarginal vein of forewing with two to seven dorsal bristles----- 36
22. Only two bristles present at each lateral margin of mesopraescutum----- 23
At least three bristles present at each lateral margin of mesopraescutum----- 25
23. Thorax elongate, with mesopraescutum as long as wide; postscutellum and propodeum smooth; anterior and posterior praescutal bristles approximately the same size----- *baldufi*, new species (p. 540)
Thorax broad and compact, with mesopraescutum much wider than long; postscutellum and propodeum with distinct, netlike sculpturing; posterior praescutal bristles larger and longer than anterior ones----- 24
24. Surface of forewing uniformly ciliated on area just distad of point of conjunction of submarginal and marginal veins (fig. 20, *e*); antennae slender, elongate, first funicle segment twice as long as broad, club only slightly wider than third funicle segment (fig. 16, *h*); metatibiae almost always entirely yellow----- *dyrus*, new species (p. 541)
Surface of forewing with a large bare area just distad of point of conjunction of submarginal and marginal veins (fig. 20, *d*); antennae more compact, first funicle segment as broad as long, club considerably wider than third funicle segment (fig. 16, *i*); metatibiae always partly dark brown or black----- *triozae*, new species (p. 542)
25. Body dark, iridescent blue; scape yellow and quite short, its apex far from reaching level of anterior ocellus; flagellum brown; femora mostly dark brown or black; gaster slender, not so wide as thorax, but only slightly longer than thorax; stigmal vein of forewing with a slender anterior spur (fig. 20, *e*); propodeal spiracles separated from anterior margin of propodeum by space equal to the diameter of a spiracle.
ovipransus Crosby and Leonard (p. 544)
Not having that combination of characters----- 26
26. Propodeum with a median carina, but without paraspiracular carinae, as in fig. 21, *e, f*; surface of propodeum smooth or very weakly sculptured----- 27
Propodeum with both median and paraspiracular carinae, as in fig. 21, *a-d*; surface of propodeum strongly shagreened or sculptured----- 28

27. Thorax dark, iridescent blue-green or green; propodeum weakly reticulated.
xanthomelaenae (Rondani) (p. 544)
 Thorax dull brown, noniridescent; propodeum smooth.
compisivorus Crawford (p. 545)
28. Metafemora entirely light yellow or white----- 29
 Metafemora partly or almost entirely dark brown, black, or iridescent--- 30
29. Dorsum of thorax with greenish iridescence; outer surface of metacoxae strongly pitted----- *euplectri* Gahan (p. 546)
 Dorsum of thorax bright, iridescent blue-green; outer surface of metacoxae with very weak and shallow indentations.
aeneoviridis (Girault) (p. 547)
30. Apex of hindwing acute, fringe at posterior margin one-half as wide as wing at hamuli, as in fig. 20, *h*----- 31
 Apex of hindwing blunt, fringe at posterior margin not more than one-third as wide as wing at hamuli----- 32
31. Second funicle segment slightly longer than first; mesal length of propodeum one-fifth as great as length of mesoscutellum.
diarthronomyiae Gahan (p. 547)
 First and second funicle segments equal in length; mesal length of propodeum one-third as great as length of mesoscutellum.
tibialis (Ashmead) (p. 548)
32. Mesotibiae almost entirely dark brown----- *scolyti* Ashmead (p. 548)
 Mesotibiae entirely light yellow or white----- 33
33. Sides of pronotum with a deep femoral groove (fig. 17, *e*); body deep, iridescent blue----- *agrili* Crawford (p. 549)
 Sides of pronotum without a femoral groove, as in fig. 17, *d*; body brown or black with iridescent greenish or brassy cast, or iridescent green-- 34
34. Apex of antennal scape reaching level of vertex; thorax iridescent green.
scriptus, new species (p. 550)
 Apex of antennal scape not surpassing level of ventral margin of anterior ocellus; thorax dark brown or black, with faint iridescent greenish or brassy cast----- 35
35. Antennal scape and pedicel uniformly brown; body very dark brown, with faint greenish iridescence----- *productus* Riley (p. 550)
 Antennal scape and apex of pedicel light yellow or white, base of pedicel brown; body black or very dark brown with brassy cast.
paracholus, new species (p. 551)
36. Head considerably broader than pronotum; entire dorsum of thorax covered by close, scalelike reticulations, as in fig. 18, *c*, and very dark steel-blue or shining black (old or teneral specimens may be brown); entire surface of gaster shagreened----- 37
 Dorsum of thorax differently sculptured; surface of gaster usually not completely shagreened----- 38
37. Marginal vein of forewing four to four and one-half times as long as stigmal; funicle segments of antenna long, slender; first segment three and one-half times as long as broad----- *tesserus*, new species (p. 552)
 Marginal vein of forewing only two and one-half to three times as long as stigmal; first funicle segment twice as long as broad.
fumipennis (Girault) (p. 553)
38. Body dark brown or black, sometimes with indistinct iridescent reflections, and with middle and hind coxae entirely light yellow or white----- 39
 Not having that combination of colors: body and middle and hind coxae either both yellow, or body brown, black, or iridescent with coxae partly or entirely dark----- 40

39. Mesopraescutum with bristles distributed over its entire surface, as in fig. 19, *e*----- hagenowii (Ratzeburg) (p. 554)
 Mesopraescutum with bristles at lateral margins only. cassidis, new species (p. 555)
40. Body elongate, slender; head rounded, with antennae inserted approximately in center of frons, well above level of ventral margins of compound eyes, as in fig. 16, *a*; postocellar line only slightly, if at all, longer than ocellocular line----- 41
 Antennae inserted at or near level of ventral margins of compound eyes, and much below center of frons; postocellar line at least one and one-half times as long as ocellocular----- 43
41. Body iridescent blue----- semiauraticeps (Girault) (p. 556)
 Body dull brown, or brown and yellow----- 42
42. Ocelli in a nearly straight line; apex of scape reaching level of anterior ocellus, first funicle segment twice as long as broad. longicorpus (Girault) (p. 557)
 Ocelli forming a low triangle, apex of scape exceeding level of vertex; first funicle segment three times as long as broad. oklahoma (Girault) (p. 557)
43. Mesoscutellum bearing five pairs of bristles, three of which are located along posterior margin of this sclerite; mesopraescutum bearing several rows of silver-colored bristles at each lateral margin-- argyrus, new species (p. 558)
 Mesoscutellum almost always bearing only two pairs of bristles, sometimes with three or four pairs----- 44
44. Mesoscutellum with four pairs of bristles; mesopraescutum with three rows of bristles at each lateral margin; length of malar space two-thirds as great as height of compound eye, antennae inserted slightly ventrad of level of ventral margins of compound eyes----- phagus, new species (p. 559)
 Mesoscutellum with two or three pairs of bristles----- 45
45. Length of malar space slightly greater than height of compound eye; antennae inserted slightly ventrad of level of ventral margins of compound eyes, apex of scape reaching level of vertex; abdomen elongate, slender, twice as long as thorax and propodeum combined; marginal vein twice as long as stigmal----- gigas, new species (p. 560)
 Length of malar space less than height of compound eye----- 46
46. Color black with faint green or blue-green iridescent reflections; body elongate, narrow; gaster one and three-fourths to twice as long as thorax and propodeum combined; antennae inserted slightly ventrad of level of ventral margins of compound eyes; length of malar space four-fifths as great as height of compound eye----- holbeini Girault (p. 561)
 Not having that combination of characters----- 47
47. Mesopraescutum with bristles distributed over entire surface, as in fig. 19, *e*; or, at least, with more than two rows of bristles at each lateral margin-- 48
 Mesopraescutum with one or two rows of bristles at each lateral margin-- 56
48. Bristles of mesopraescutum distributed over entire surface in a rather haphazard manner; some bristles contiguous with mesal furrow, as in fig. 19, *c*----- 49
 Mesopraescutal bristles not present on meson; three to five rows of bristles present at each lateral margin, but none contiguous with mesal furrow, as in fig. 19, *b*, *d*----- 52
49. Metatibiae almost entirely dark brown or black-- modestus Howard (p. 562)
 Metatibiae entirely light yellow or white----- 59

50. Malar furrow curved and forming, with ocular suture, a triangle at ventral margin of compound eye (fig. 16, *c*), length of malar space two-thirds as great as height of compound eye----- *pattersonae* Fullaway (p. 563)
Malar furrow straight (fig. 16, *b*); length of malar space one-half as great as height of compound eye----- 51
51. Antennal club short, ovate, less than twice as long as second funicle segment; body usually bright, iridescent green, with femora entirely light yellow or white; forewing of male with a conspicuous patch of dark setae on anterior margin near apex----- *spilopteris*, new species (p. 564)
Antennal club almost three times as long as second funicle segment; body usually entirely very dark brown, almost black, occasionally with faint iridescent reflections, femora always partly brown; forewing of male without a patch of dark setae----- *verrucarii* Balduf (p. 565)
52. Body varying from very dark brown to black, and with only very faint iridescent blue or blue-green reflections; submarginal vein of forewing with two dorsal bristles; mesoscutellum often bearing three pairs of bristles; propodeal spiracles round, paraspircular carinae faint, posterior end reaching postspiracular suture, as in fig. 21, *b*; postscutellum smooth.
carpatius, new species (p. 566)
Not having that combination of characters; propodeum either lacking paraspircular carinae, or these carinae present and posterior end reaching posterior margin of propodeum----- 53
53. Marginal vein of forewing three or more times as long as stigmal vein---- 54
Marginal vein of forewing twice as long as stigmal vein----- 55
54. Surface of propodeum shagreened, paraspircular carinae present, median carina well developed----- *hunteri* Crawford (p. 567)
Surface of propodeum smooth, paraspircular carinae wanting, median carina only vaguely indicated----- *turionum* (Hartig) (p. 568)
55. Metatibiae partly dark brown----- *caerulescens* Ashmead (p. 568)
Metatibiae entirely light yellow or white----- *dolosus* Gahan (p. 570)
56. Setae laterad and ventrad of scrobe cavity set in deep pits; ocellar triangle with large, deep punctures (fig. 17, *c*); a triangular fracture present at ventral margin of each compound eye (this fracture very small in one species)----- 57
Setae on face not set in deep pits; ocellar triangle not with large, deep pits; triangular fracture not present at ventral margin of each compound eye. 60
57. Paraspircular carinae absent, surface of propodeum shining and with very shallow, obscure reticulations; prepectus faintly reticulated.
strobilus, new species (p. 570)
Paraspircular carinae present, surface of propodeum strongly sculptured; prepectus deeply punctured or strongly reticulated----- 58
58. Rudimentary petiole with dorsal surface smooth, as in fig. 21, *e*; propodeum with shallow reticulate sculpturing----- *sobrius* Gahan (p. 572)
Rudimentary petiole with dorsal surface distinctly sculptured, as in fig. 21, *b*; propodeum closely and deeply punctured----- 59
59. Thorax dark, iridescent blue-green with occasional purplish reflections; median groove of mesopraescutum relatively broad; propodeum with median and paraspircular carinae, fig. 21, *b*----- *punctatifrons* (Girault) (p. 572)
Thorax dark, shining brown or black, noniridescent; median groove of mesopraescutum fine; propodeum with median, paraspircular, and oblique carinae, as in fig. 21, *d*----- *banksii* Howard (p. 573)
60. Apex of hindwing acute, as in fig. 20, *f, h*; fringe at posterior margin one-half or more as wide as wing at hamuli----- 61

- Apex of hindwing blunter, as in fig. 20, *g. i*; fringe at posterior margin one-third or less as wide as wing at hamuli----- 63
61. First funicle segment of antenna, long, slender, more than four times as long as wide, fig. 16, *g*----- *gibboni* (Girault) (p. 574)
- First funicle segment not more than two and one-half times as long as wide----- 62
62. All funicle segments equal in length; surface of mesoscutellum smooth.
polynemae Ashmead (p. 575)
- First funicle segment one and one-half times as long as second (fig. 16, *e*); surface of mesoscutellum with distinct, shallow reticulations.
oecanthivorus compar Gahan (p. 575)
63. Dorsum of thorax bright yellow with iridescent black or bluish-green spots.
venustus Gahan (p. 576)
- Dorsum of thorax not having a combination of yellow and iridescent coloration----- 64
64. Thorax metallic green with the tegulae and a spot on dorsal margin of mesopleuron yellow; bases of hind coxae dark, remainder of hindlegs and other legs entirely, yellow or white----- *xanthops* (Ratzeburg) p. 577
- Not having that combination of colors; thorax either entirely yellow, or brown, black, or iridescent blue-green without a yellow spot on dorsal margin of mesopleuron----- 65
65. Propodeum with paraspiracular carinae, as in fig. 21, *a-d*----- 66
- Propodeum without paraspiracular carinae, as in fig. 21, *e, f*----- 67
66. Metatibiae usually entirely light yellow or white, sometimes slightly darkened, occasionally mostly brown; metapleuron with rather deep, close, scale-like reticulations, the lateral area of propodeum with shallower, more indistinct reticulations (fig. 17, *f*); metacoxae with a distinct, iridescent purple luster; gaster never greatly longer than thorax and propodeum combined, at most one and one-third times as long, the two tagmata often equal in length.
racemariae Ashmead (p. 578)
- Not having that combination of characters; metatibiae always mostly dark brown; metapleuron and lateral area of propodeum both with nearly the same type of sculpture (fig. 17, *g*); metacoxae black.
cornus, new species (p. 579)
67. Mesopraescutum lacking a median, longitudinal groove and bearing one row of bristles at each lateral margin; body black or very dark brown, with very faint bluish or greenish iridescent reflections sometimes visible; tibiae entirely light yellow or white; surface of propodeum almost smooth, its median length one-third as great as length of mesoscutellum; spiracles contiguous with anterior margin of propodeum; gaster only slightly longer than thorax and propodeum combined----- *minutus* (Howard) (p. 580)
- Not having that combination of characters; median longitudinal groove of mesopraescutum usually distinct----- 68
68. Marginal vein of forewing four or more times as long as stigmal vein; body elongate and black, with very faint iridescent bluish or greenish luster-- 69
- Not having that combination of characters; marginal vein of forewing never more than three and one-half times as long as stigmal vein, usually less than three times as long----- 70
69. Mesotibiae entirely light yellow or white; marginal vein of forewing four and one-half times as long as stigmal vein--- *faustus*, new species (p. 582)
- Mesotibiae partly dark brown; marginal vein four times as long as stigmal.
hibus, new species (p. 582)
70. Body iridescent green, blue, blue-green or somewhat purplish (not visible in teneral specimens); may be very dark brown or black with rather faint

- iridescent green or blue-green sheen, but dorsum of thorax always with a distinct bright-colored sheen, and never dull brown or black or shining, jet black----- 71
- Body yellow, brown or black, noniridescent----- 80
71. First funicle segment elongate, from one and two-fifths to one and one-half times as long as second segment (fig. 16, *d*) ; mesal length of propodeum one-sixth as great as length of mesoscutellum ; antennae inserted slightly dorsad of level of ventral margins of compound eyes ; legs distad of coxae almost always entirely light yellow or white, metafemora occasionally darkened on basal half----- *carinatus* Forbes (p. 583)
- Not having that combination of characters----- 72
72. Body bright, iridescent blue-green ; frons iridescent purple ; apex of scape almost reaching level of vertex ; abdomen acute at apex and elongate, almost twice as long as thorax----- *repulsus* Girault (p. 584)
- Face not iridescent purple----- 73
73. Body iridescent blue ; gaster equal in length to thorax, and these tagmata equal in width ; submarginal vein of forewing with two dorsal bristles ; antennae unusually short, the funicle segments becoming progressively broader and shorter toward apex, much as in fig. 16, *f*.
malophilus, new species (p. 585)
- Not having that combination of characters----- 74
74. Spiracles almost or quite contiguous with anterior margin of propodeum, as in fig. 21, *f*----- 75
- Spiracles separated from anterior margin of propodeum by a space at least one-half as great as length of a spiracle, as in fig. 21, *a, c, e*----- 76
75. Thorax bright, iridescent blue ; marginal vein of forewing only slightly more than twice as long as stigmal vein----- *bruchophagi* Gahan (p. 585)
- Thorax brown, with a rather faint blue luster ; marginal vein of forewing three and one-half times as long as stigmal vein.
marcovitchi (Crawford) (p. 586)
76. Propodeum long ; its mesal length more than one-fourth as great as length of mesoscutellum----- 77
- Propodeum shorter ; its mesal length only one-fifth or one-sixth as great as length of mesoscutellum----- 78
77. Body bright, iridescent green or blue-green ; anterior tibiae tan or brown, usually slightly darker than middle and hind tibiae ; antennal scape mostly black----- *rapo* (Walker) (p. 587)
- Body brown with rather faint green iridescent sheen ; all tibiae white or yellow ; antennal scape almost entirely light yellowish or white.
microrhopalae Ashmead (p. 588)
78. Body dark, iridescent blue ; antennal scape short, its apex not reaching level of anterior ocellus, club longer than two distal funicle segments combined.
chlamytis Ashmead (p. 589)
- Body dark brown or black with rather faint iridescent blue or blue-green sheen ; apex of antennal scape reaching level of anterior ocellus, club as long as two distal funicle segments combined----- 79
79. Head and body faintly iridescent blue-green ; mesopraescutum with one row of bristles at each lateral margin----- *gerstaeckeriae* Gahan (p. 590)
- Head and body iridescent blue or blue-green with faint purplish cast ; mesopraescutum with two rows of bristles at each lateral margin.
rugglesi Rohwer (p. 590)

80. All funicle segments broad and short, and each segment slightly broader and shorter than the segment proximad of it, club broad, subglobose, as in fig. 16. *f*----- 81
- All funicle segments nearly or quite equal in width, and club not conspicuously short----- 82
81. Mesopraescutum with two rows of bristles at each lateral margin; spiracles separated from anterior margin of propodeum by a space one-half as great as length of a spiracle; antennal funicle and club both brown.
thanasimi Ashmead (p. 591)
- Mesopraescutum with one row of bristles at each lateral margin; spiracles contiguous with anterior margin of propodeum; antennal funicle brown, club yellow----- *varicornis* (Girault) (p. 592)
82. Head and body entirely brown or black----- 83
- Head and body partly or entirely yellow; at least area of head around mouth-parts and mesal area of postscutellum yellow----- 87
83. Mesal length of propodeum one-fourth as great as length of mesoscutellum; body broad, short and compact; length of gaster equal to or less than length of thorax; gaster broad, thorax and abdomen appear to be equal in width; mesopraescutum broader than long; body uniformly dull brown or black.
neuroteri (Ashmead) (p. 592)
- Not having that combination of characters----- 84
84. Tibiae partly dark brown or black; first funicle segment one and one-sixth times as long as second segment; body shining black, and antennae entirely black----- *silvaticus* Gahan (p. 593)
- Tibiae usually entirely light yellow or white, occasionally faintly shaded with tan, but never partly dark brown or black----- 85
85. Segments of antennal funicle elongate, first segment one and one-third times as long as second----- *nebraskensis* (Girault) (p. 594)
- Segments of antennal funicle subquadrate, first and second segments equal in length or second slightly longer than first----- 86
86. Gaster elongate, slender; twice as long as thorax-- *rosae* Ashmead (p. 595)
- Gaster subglobose (flattened in dry specimens), only slightly longer than thorax----- *blastophagi* (Ashmead) (p. 595)
87. Spiracular grooves of propodeum almost obliterated, median length of propodeum three-eighths as great as length of mesoscutellum; one stout bristle present laterad of each propodeal spiracle; abdomen subglobose, slightly broader than thorax, and apices of ovipositor sheaths just reaching apex of abdomen----- *lasius*, new name (p. 596)
- Spiracular suture clearly extending from spiracle to posterior margin of propodeum; apices of ovipositor sheaths slightly exceeding apex of abdomen----- 88
88. First funicle segment of antenna one and one-third times as long as second segment----- 89
- First funicle segment as long as or slightly shorter than second segment-- 90
89. Dorsum of thorax mostly yellow, abdomen yellow with transverse brown bands----- *juniperi* (Crawford) (p. 597)
- Dorsum of thorax almost entirely brown; abdomen uniformly brown.
nebraskensis (Girault) (p. 594)
90. Second funicle segment of antenna longer than first; median length of propodeum one-third as great as length of mesoscutellum; body mostly brown, abdomen uniformly brown----- *impexus* Girault (p. 597)
- First and second funicle segments equal in length; median length of propodeum one-fifth as great as length of mesoscutellum; body usually mostly yellow, abdomen with transverse brown bands-- *marylandensis* (Girault) (p. 598)

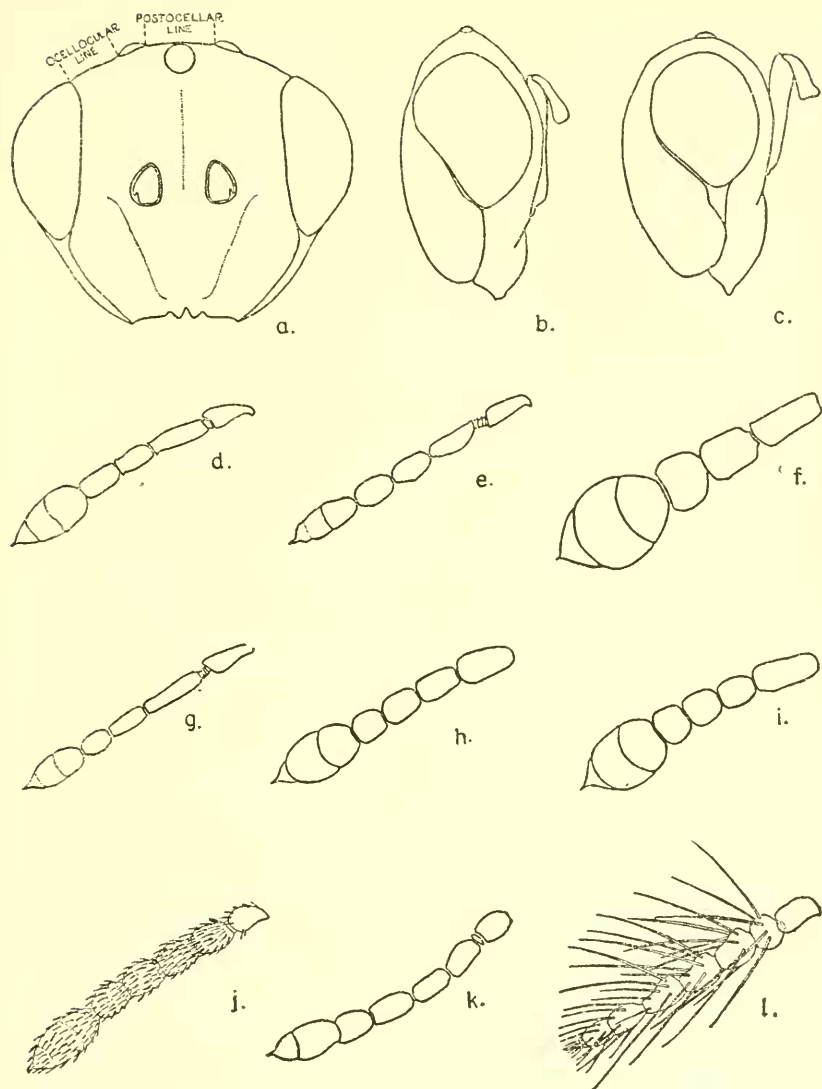


FIGURE 16.—HEAD AND ANTENNAE OF TETRASTICHUS

- a, *T. longicarpus* (Girault): Anterior aspect of head.
 b, *T. spilopectris*, new species: Lateral aspect of head.
 c, *T. pattersonae* Fullaway: Lateral aspect of head.
 d, *T. carinatus* Forbes: Pedicel and flagellum of ♀ antenna.
 e, *T. oecanthivorus compar* Gahan: Pedicel and flagellum of ♀ antenna.
 f, *T. varicornis* (Girault): Pedicel and flagellum of ♀ antenna.
 g, *T. gibboni* (Girault): Pedicel and flagellum of ♀ antenna.
 h, *T. dyrus*, new species: Pedicel and flagellum of ♀ antenna.
 i, *T. triozae*, new species: Pedicel and flagellum of ♀ antenna.
 j, *T. cormus*, new species: Pedicel and flagellum of ♂ antenna.
 k, *T. xanthops* (Ratzeburg): Pedicel and flagellum of ♀ antenna.
 l, *T. triozae*, new species: Pedicel and flagellum of ♂ antenna.

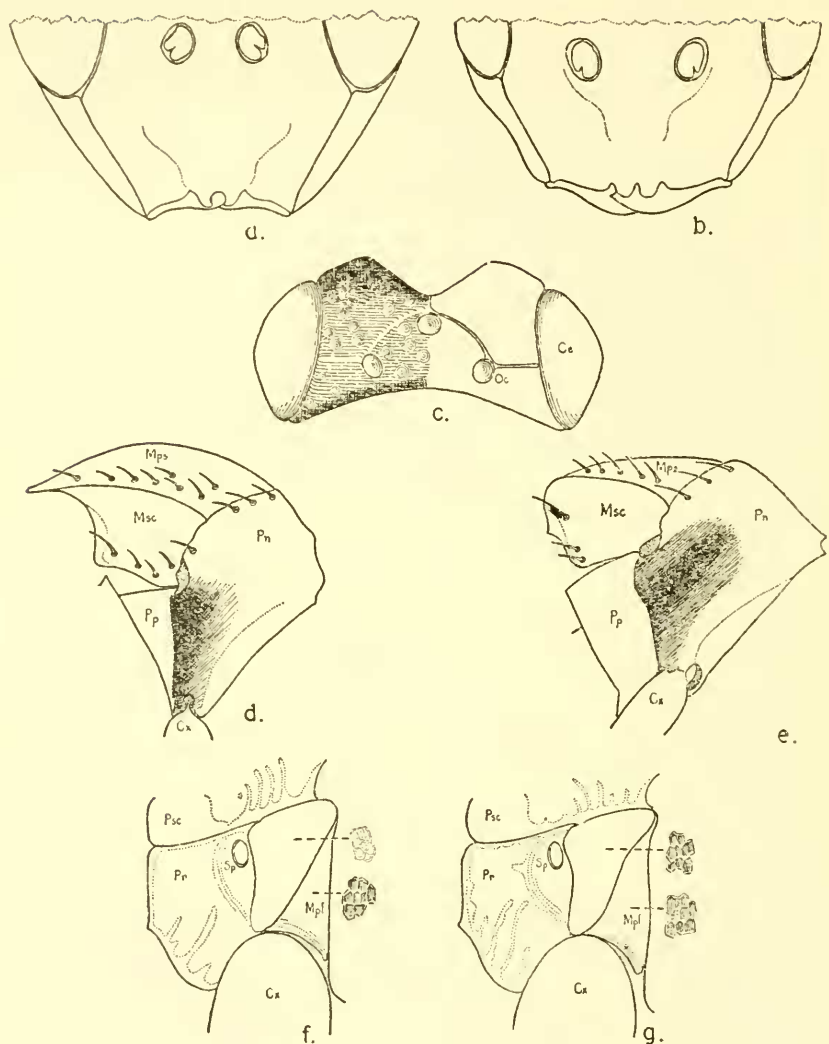


FIGURE 17.—HEAD, THORAX, AND ABDOMINAL STRUCTURES OF TETRASTICHUS

- a, *T. hylotomae* (Ashmead): Anterior aspect of lower half of head.
 b, *T. asparagi* Crawford: Anterior aspect of lower half of head.
 c, *T. punctatifrons* (Girault): Dorsal aspect of head. (Ce, compound eye; Oc, ocellus.)
 d, *T. bruchophagi* Gahan: Lateral aspect of prothorax and part of mesothorax. (Cx, coxa; Mps, mesopraescutum; Msc, scapula; Pn, pronotum; Pp, prepectus.)
 e, *T. longicarpus* (Girault): Lateral aspect of prothorax and part of mesothorax.
 f, *T. racemariae* Ashmead: Lateral aspect of propodeum and metapleuron. (Cx, coxa; Mpl, metapleuron; Pr, propodeum; Psc, postscutellum; Sp, spiracle.)
 g, *T. cornus*, new species: Lateral aspect of propodeum and metapleuron.

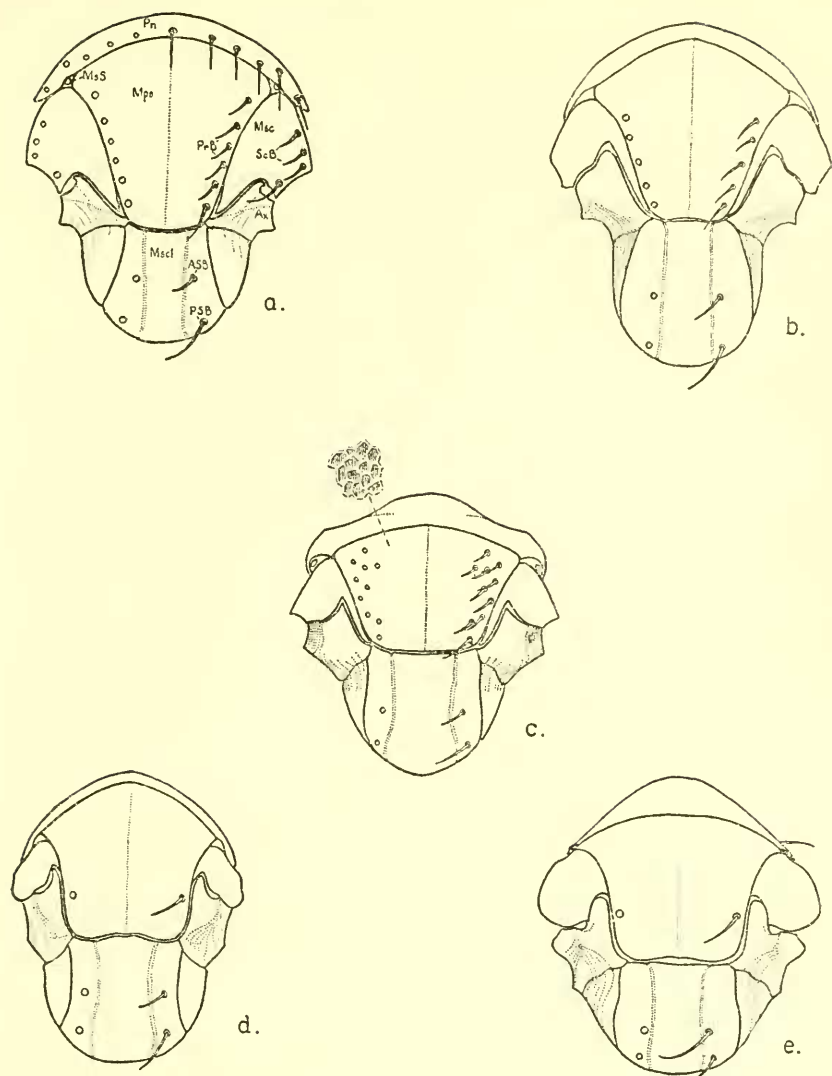


FIGURE 18.—THORAX, DORSAL ASPECT, OF TETRASTICHUS

- a*, Generalized *Tetrastichus* thorax. (*ASB*, anterior scutellar bristle; *Ax*, axilla; *Mps*, meso-praescutum; *Msc*, scapula; *Mscf*, mesoscutellum; *MsS*, thoracic spiracle; *Pn* pronotum; *PrB*, praescutal bristles; *PSB*, posterior scutellar bristle; *ScB*, scapular bristles.)
b, *T. asparagi* Crawford.
c, *T. fumipennis* (Girault).
d, *T. whitmani* (Girault).
e, *T. flora* (Girault).

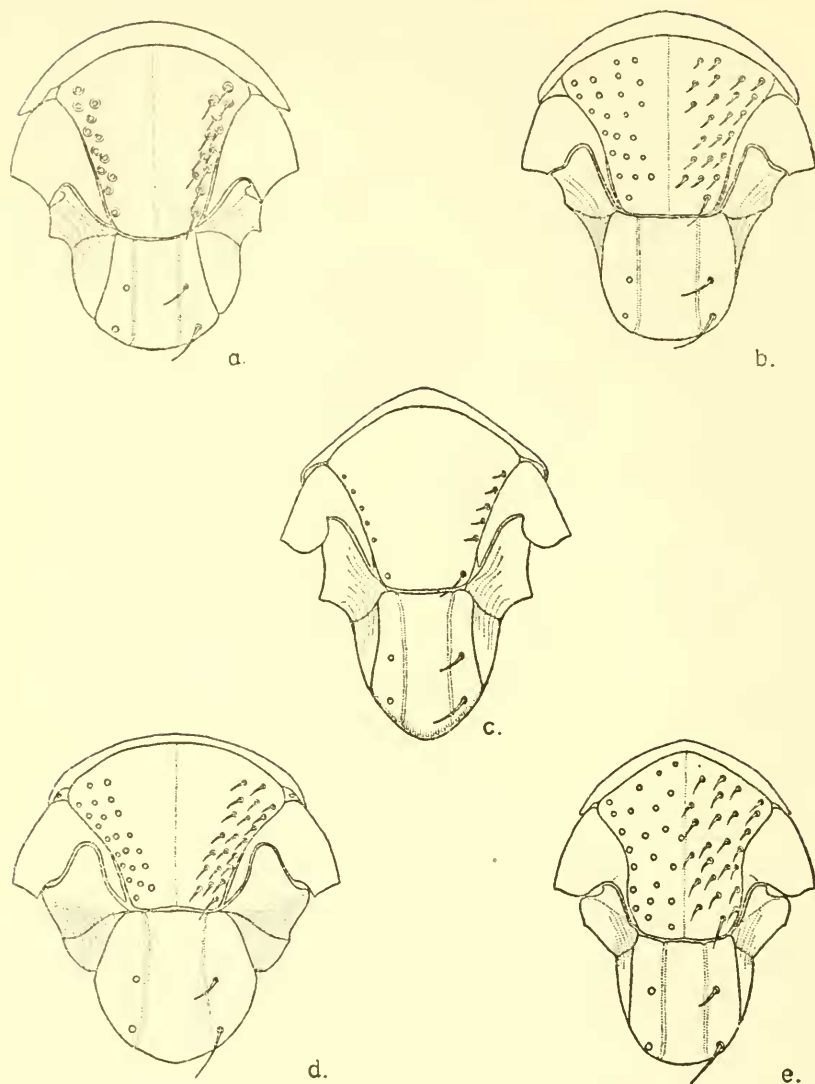


FIGURE 19.—THORAX, DORSAL ASPECT, OF *TETRASTICHUS*

- a, *T. punctatifrons* (Girault).
b, *T. caerulescens* Ashmead.
c, *T. melanis*, new species.
d, *T. hunteri* Crawford.
e, *T. verrucarii* Balduf.

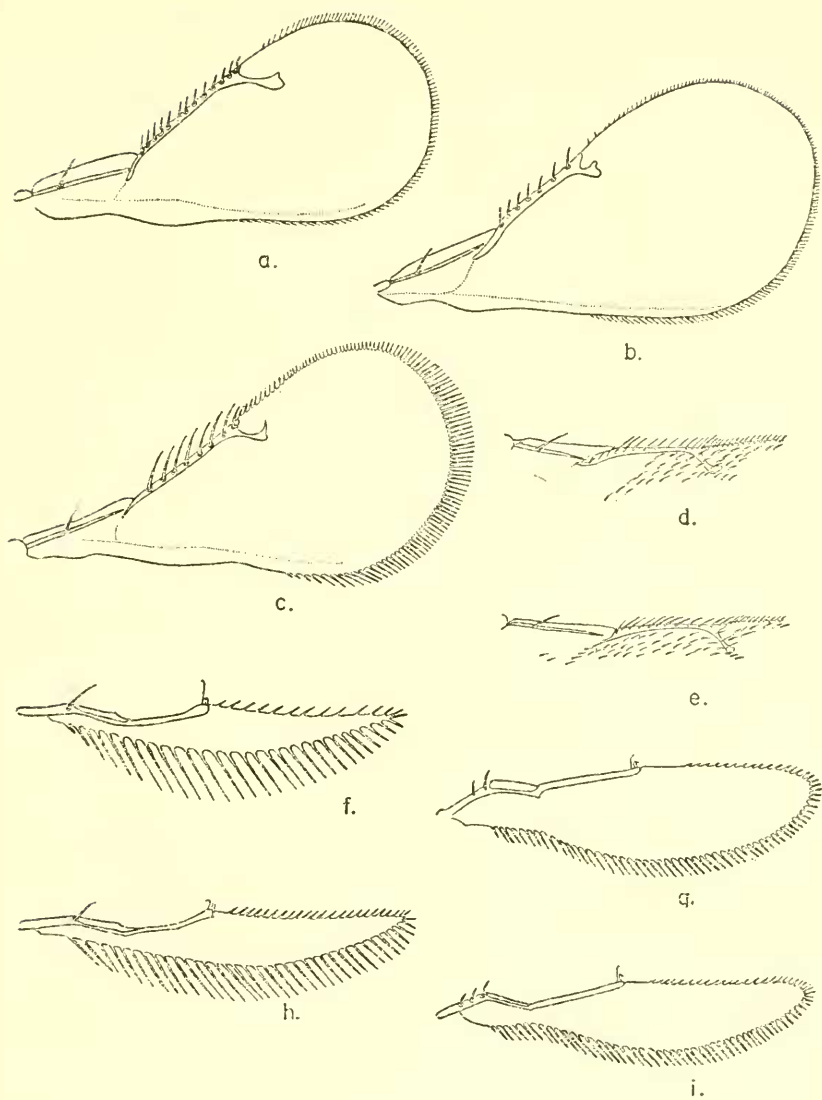


FIGURE 20.—WINGS OF TETRASTICHUS

- a*, *T. johnsoni* Ashmead: Forewing.
b, *T. brevistigma* Gahan: Forewing.
c, *T. ovipransus* Crosby and Leonard: Forewing.
d, *T. triozae*, new species: Anterobasal area of forewing.
e, *T. dyrus*, new species: Anterobasal area of forewing.
f, *T. polynemae* Ashmead: Hindwing.
g, *T. asparagi* Crawford: Hindwing.
h, *T. ainsliei* Gahan: Hindwing.
i, *T. carinatus* Forbes: Hindwing.

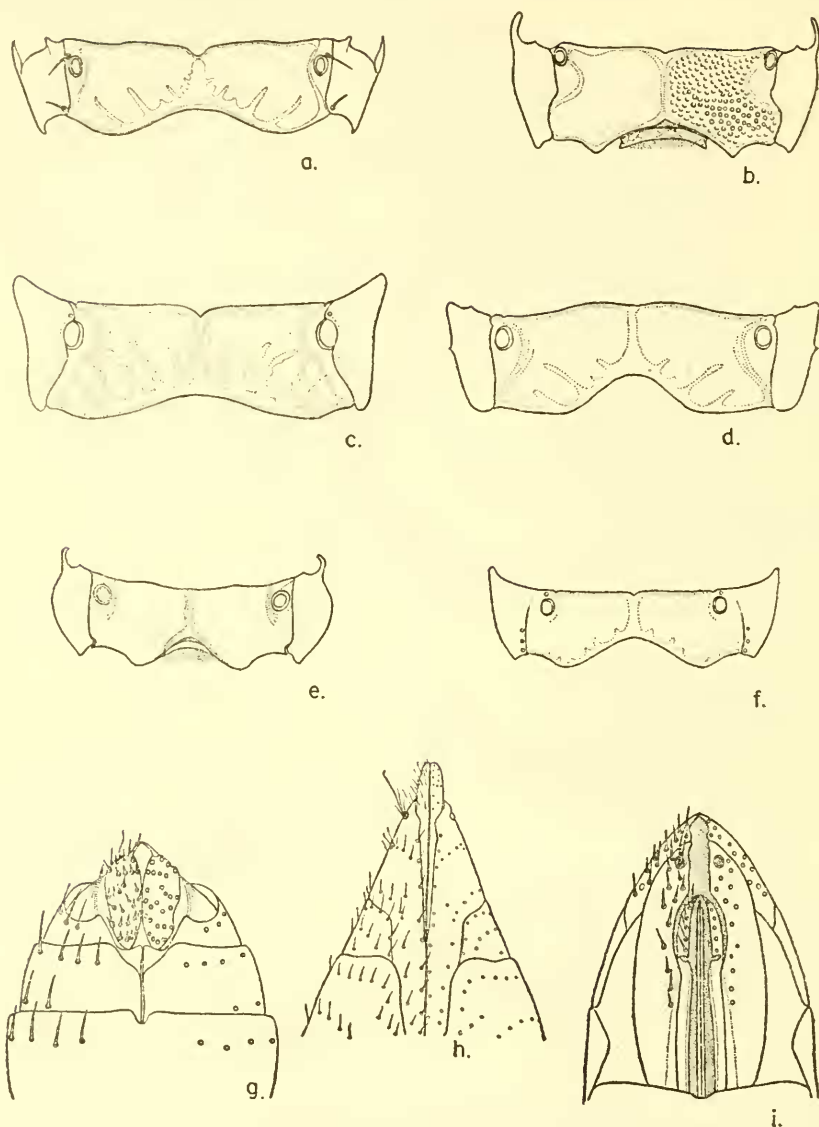


FIGURE 21.—ABDOMINAL STRUCTURES OF TETRASTICHUS

- a, *T. fumipennis* (Girault): Propodeum.
 b, *T. punctatifrons* (Girault): Propodeum.
 c, *T. cornus*, new species: Propodeum.
 d, *T. racemariae* Ashmead: Propodeum.
 e, *T. rapo* (Walker): Propodeum.
 f, *T. bruchophagi* Gahan: Propodeum.
 g, *T. chrysopae* (Crawford): Ventral aspect of apex of ♀ gaster.
 h, *T. cornus*, new species: Ventral aspect of apex of ♀ gaster.
 i, *T. hylotomae* (Ashmead): Ventral aspect of apex of ♀ gaster.

TETRASTICHUS CHRYSOPAE (Crawford), new combination

FIGURE 21, *g*

Geniocerus chrysopae CRAWFORD, Proc. U. S. Nat. Mus., vol. 48, p. 584, 1915.

Tetrastichodes chrysopae (Crawford) GIRAULT, Societas entomologica, vol. 31, p. 35, 1916.

Aprostoceroideus annapolis GIRAULT, Chalcidoidea nova Marilandensis, pt. 2, p. 2, 1917. (New synonymy.)

Black or very dark brown, sometimes faintly iridescent; apices of femora, tibiae usually, and basal three segments of tarsi, white or light yellow; tibiae often more or less brown.

Female.—Length, 1.0–1.2 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus; all funicle segments equal in length; antennal club equal in length to funicle; length of malar space one-half height of compound eye; length of postocellar line twice as great as ocellocular. Mesopraescutum slightly wider than long, bearing one row of bristles at each lateral margin; submarginal vein of forewing with two dorsal bristles; hindwing blunt at apex, fringe at posterior margin one-third as wide as wing at hamuli. Surface of propodeum almost smooth, under strong light showing faint reticulations, mesal length of propodeum one-third as great as that of mesoscutellum; median carina of propodeum usually entirely wanting, occasionally faintly indicated, paraspicular carinae wanting; spiracles almost contiguous with anterior margin of propodeum; diameter of spiracles two-thirds as great as mesal length of propodeum; gaster slightly shorter than thorax; ovipositor sheaths flattened and padlike (fig. 21, *g*).

Male.—Length, 1.0 mm. Darkened anterior carina of scape almost as long as scape, first funicle segment three-fifths as long as second, three distal segments equal in length, setae borne by funicle segments slightly shorter than segments themselves; club slightly longer than three apical funicle segments; gaster one-fifth shorter than thorax; apex of ninth tergite acute, as in female.

Type locality.—Batesburg, S. C.

Type.—U.S.N.M. No. 18380.

Hosts.—Pupae of lacewing flies, *Chrysopa rufilabris* Burmeister, *C. plorabunda* Fitch, *C. oculata* Say.

Distribution.—California, District of Columbia, Florida, Illinois, Maryland, North Carolina, Ohio, South Carolina, Tennessee, Texas; Mexico.

TETRASTICHUS THRIPOPHONUS Waterston

Tetrastichus sp. MASON, Ent. News, vol. 33, p. 199, 1922.

Tetrastichus thripophonus WATERSTON, Bull. Ent. Res., vol. 13, p. 453, 1923.—TAYLOR, Fiji Legis. Council Paper, No. 14, 5 pp., 1928.—SIMMONDS, Journ. Agr. Fiji, vol. 3, p. 58, 1930.

Tetrastichus tatei DOZIER, Journ. Agr. Univ. Puerto Rico, vol. 21, p. 129, 1937.
(New synonymy.)

Dull brown, with antennae, area of head around mouthparts, tegulae, entire front and middle femora and apices of hind femora, tibiae, basal segments of tarsi, and base of gaster light yellow or white.

Female.—Length, 1.0–1.1 mm. Antennae inserted at level of ventral margins of compound eyes; margin of ventral tooth of mandible minutely serrulate; apex of antennal scape not quite reaching level of anterior ocellus; pedicel and second and third funicle segments equal in length, first segment slightly shorter than second, club wider than funicle and almost as long as it; postocellar line one and one-half times as long as ocellular; area of frons laterad and dorsad of scrobe cavity with well-marked, transverse reticulations. Mesopraescutum bearing two bristles at each lateral margin; submarginal vein of forewing with two dorsal bristles; apex of hindwing acute, fringe at posterior margin two-thirds as wide as wing at hamuli. Surface of propodeum smooth, median and paraspicular carinae absent; mesal length of propodeum two and one-third times as great as mesal length of metanotum, and two-thirds as long as mesoscutellum; propodeal spiracles contiguous with anterior margin; gaster narrow, blunt at apex, and as long as thorax; apex of ovipositor sheaths not quite reaching apex of abdomen, sheaths enlarged, and bearing only four or five bristles.

Male.—Unknown.

Type locality.—Trinidad, British West Indies.

Type.—One female specimen in the British Museum.

Hosts.—Prepupae of thrips, *Liothrips laureli* (Mason), *Liothrips urichi* Karny, *Gynaikothrips uzeli* (Zimmerman).

Distribution.—Florida; Puerto Rico; Trinidad, British West Indies; Fiji.

Remarks.—Waterston's excellent description makes it possible to identify with certainty this distinctive species without examining the type.

TETRASTICHUS JOHNSONI Ashmead

FIGURE 20, *a*

Tetrastichus johnsoni ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, p. 233, 1896.—FRISON, Bull. Illinois Nat. Hist. Surv., vol. 16, p. 223, 1927.

Aprostocetus johnsoni (Ashmead) GIRAULT, Societas Entomologica, vol. 31, p. 35, 1916.

Very dark brown or black, noniridescent; scape and pedicel, apices of coxae, trochanters, bases and apices of femora, tibiae, and basal three segments of tarsi light yellow or white.

Female.—Length, 1.1–1.2 mm. Antennae inserted at level of ventral

margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; pedicel three-quarters as long as first funicle segment, all funicle segments subequal in length, first slightly shorter than second; club as long as two distal funicle segments; length of malar space one-half as great as height of compound eye; postocellar line one and one-half times as long as ocellocular line. Mesopraescutum wider than long and bearing three or four long bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing blunt, fringe at posterior margin one-third as wide as wing at hamuli. Surface of propodeum strongly reticulated, paraspiracular carinae present; mesal length of propodeum one-half as great as length of mesoscutellum; propodeal spiracles almost touching anterior margin; gaster rounded, short, equal in length to thorax; apices of ovipositor sheaths just reaching apex of abdomen, occasionally not quite reaching apex.

Male.—Length, 0.6–0.9 mm. Pedicel and first funicle segment of antenna equal in length, three distal segments of funicle equal in length and each one-eighth longer than first, funicle segments slightly enlarged near bases, bearing long setae, as in figure 16, *l*; gaster as long as thorax.

Type locality.—Urbana, Ill.

Types.—U. S. N. M. No. 385; paratypes in Illinois State Natural History Survey Collection.

Host.—Reared from the nest of a spider wasp, *Phanagenia bombycina* (Cresson), but may not be a primary parasite of it.

Distribution.—Illinois.

TETRASTICHUS LISSUS, new species

Thorax black, with iridescent blue luster; head and gaster very dark brown or black, with very faint iridescence; antennal scape, bases and apices of femora, tibiae, and basal three segments of tarsi light yellow or white; flagellum of antenna and apical segment of tarsi tan.

Female.—Length, 1.6–1.7 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus; pedicel one and one-half times as long as first funicle segment, all three funicle segments of equal length and each almost as wide as long, club as long as funicle; height of compound eye only one and one-quarter times as great as length of malar space; postocellar line one and one-half times as long as ocellocular. Mesopraescutum with two or three rather irregular rows of bristles at each lateral margin; longitudinal grooves of mesoscutellum obliterated at anterior margin; submarginal vein of forewing with four or five dorsal bristles, marginal vein short, less than twice as long as stigmal vein; apex of hindwing blunt, fringe at posterior

margin one-fifth as wide as wing at hamuli. Surface of propodeum slightly reticulated, almost smooth, obscure median, paraspiracular and oblique carinae present; spiracles round, almost touching anterior margin of propodeum; median length of propodeum one-third as great as length of mesoscutellum; gaster broad, blunt at apex, slightly shorter than thorax; apices of ovipositor sheaths not reaching apex of abdomen.

Male.—Unknown.

Type locality.—Snowflake, Ariz.

Types.—U.S.N.M. No. 56236.

Described from 4 female specimens, one of which is the holotype, reared June 10, 1932, from the pods of locoweed (*Astragalus mollissimus*) by E. E. Russell, under Tempe No. 6882.

TETRASTICHUS ICHTHYUS, new species

Head and thorax with relatively large and intense reticulate sculpturing, and with blue, blue-green, or purplish iridescence, frons strikingly iridescent purple; gaster, coxae, trochanters, and most of femora very dark brown; area of head around mouthparts, pedicel and flagellum of antenna usually, and apical segment of tarsi tan; scape, bases and apices of femora, tibiae, and basal three segments of tarsi light yellow or white; entire antenna may be yellow.

Female.—Length, 1.5–1.7 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus; pedicel slightly longer than first funicle segment, first and second segments equal in length, third slightly shorter, club as long as first and second funicle segments combined; length of malar space two-thirds as great as height of compound eye; postocellar line twice as long as ocellocular. Mesopraescutum with two or three rather irregular rows of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles, marginal vein two and one-half times as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-fifth as wide as wing at hamuli. Surface of propodeum shagreened, and with strong median, paraspiracular, and oblique carinae, as in figure 21, *d*; median length of propodeum one-third as great as length of mesoscutellum; spiracles almost touching anterior margin of propodeum; gaster broad and slightly shorter than thorax; apices of ovipositor sheaths not quite reaching apex of abdomen.

Male.—Length, 1.4 mm. Darkened anterior carina of scape two-thirds as long as scape, pedicel slightly longer than first funicle segment, all four funicle segments of equal length, semiquadrate and without long bristles, club slightly more than twice as long as a funicle

segment; marginal vein twice as long as stigmal vein; gaster two-thirds to four-fifths as long as thorax.

Type locality.—Idlewild, Tex.

Types.—U.S.N.M. No. 56259.

Described from the female holotype, male allotype, and 1 male and 12 female paratypes reared January 8–April 9, 1891, from small globose leaf galls on live oak, under Bureau of Entomology No. 4841⁹⁵. The host is probably *Dryophanta emoryi* Ashmead. The galls were sent in to the Bureau by L. Biediger. Seven additional specimens of this species, not included in the type series, were possibly reared from the gall of *Neuroterus rileyi* (Bassett). These latter specimens are from some unknown locality.

TETRASTICHUS MELANIS, new species

FIGURE 19, c

Shining black; mouthparts, bases and apices of femora and tibiae, and basal segments of tarsi yellow or brown; teneral specimens dark brown instead of black.

Female.—Length, 1.3–1.9 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus; all funicle segments slightly longer than broad, and equal in length, club slightly longer than two funicle segments; length of malar space two-thirds to three-quarters height of compound eye; postocellar line one and one-half times as long as ocellular. Mesopraescutum as wide as long (fig. 19, c) and bearing one row of bristles at each lateral margin, median furrow absent; submarginal vein of forewing bearing one dorsal bristle; apex of hindwing blunt, fringe at posterior margin one-fourth as wide as wing at hamuli; scutellum sometimes with three pairs of bristles, anterior pair located close to anterior margin. Propodeum shagreened; paraspicular carinae present; mesal length of propodeum one-third length of mesoscutellum; propodeal spiracles large, close to but not quite touching anterior margin; gaster as long as thorax; ovipositor sheaths not reaching apex of abdomen.

Male.—Length, 1.3–1.4 mm. Darkened anterior carina of scape two-thirds as long as scape, second funicle segment one-fifth longer than first, third and fourth equal in length and each one-half longer than first, club as long as two apical funicle segments; funicle segments bearing bristles approximately as long as segments; gaster slightly longer than thorax; apex of ninth tergite acute, as in female.

Type locality.—Wenatchee, Wash.

Types.—U.S.N.M. No. 56237.

Described from 36 female and 7 male specimens as follows: Female holotype, male allotype, and 13 female and 2 male paratypes, reared

from the pupa of *Coccinella 5-notata* Kirby, August 1, 1915 (Quaintance No. 11467), by E. J. Newcomer; 1 male and 11 female paratypes, Guelph, Ontario, reared from a coccinellid predaceous on a turnip aphid, August 20, 1934, W. E. Heming; and 11 female and 3 male paratypes, Cambridge, Mass., reared from *Coccinella* sp.

TETRASTICHUS BREVISTIGMA Gahan

FIGURE 19, b

Tetrastichus brevistigma GAHAN, Proc. Ent. Soc. Washington, vol. 33, p. 76, 1936.—BERRY, U. S. Dept. Agr. Circ. 485, 1938.

Body shining black; head, antennae, middle parts of middle and hind femora, and apical segments of tarsi brown; coxae black at base, yellow or white at apex; rest of legs yellow; abdomen slightly lighter at base.

Female.—Length, 1.0–1.5 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of vertex; first funicle segment slightly longer than second, second and third equal in length; club slightly shorter than three funicle segments; length of malar space three-fourths as great as height of compound eye; postocellar line twice as long as ocellular. One row of bristles present at each lateral margin of mesopraescutum; submarginal vein of forewing with one dorsal bristle; stigmal vein at most one-sixth as long as marginal; hindwing acute at apex, fringe at posterior margin one-third as wide as wing at hamuli. Propodeum very faintly shagreened; mesal length of propodeum slightly less than one-third length of mesoscutellum; median carina of propodeum vague, no paraspiracular carinae present; spiracles touching anterior margin of propodeum; gaster and thorax equal in length; apices of ovipositor sheaths not quite reaching apex of abdomen.

Male.—Length, 0.8 mm. All four funicle segments equal in length and bearing setae only slightly longer than segments; club equal in length to three funicle segments.

Type locality.—Middleboro, Mass.

Types.—U.S.N.M. No. 51446.

Host.—Pupa of the elm leaf beetle, *Galerucella xanthomelaena* (Schrank).

Distribution.—Connecticut, District of Columbia, Massachusetts, New Hampshire, New York, Ohio. It has also been introduced into California.

TETRASTICHUS PANDORA, new species

Brown, or black, with very faint iridescent blue or lavender luster; area of head around mouthparts, antennae, and all of legs except bases of coxae light yellow or white; apical segment of tarsi and sometimes

antennal flagellum slightly darkened. Male may have thorax largely yellow and abdomen yellow at base, with legs entirely yellow.

Female.—Length, 1.4–1.6 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus; pedicel globular, and slightly narrower and shorter than first funicle segment, all three funicle segments equal in length, club slightly more than twice as long as a funicle segment; length of malar space one-half as great as height of compound eye; postocellar line twice as long as ocellocular line. Mesopraescutum with one row of bristles at each lateral margin; submarginal vein of forewing with from four to six dorsal bristles, marginal vein three times as long as stigmal; apex of hindwing blunt, fringe at posterior margin almost one-fourth as wide as wing at hamuli. Surface of propodeum smooth, paraspircular carinae wanting; spiracles contiguous with anterior margin of propodeum; median length of propodeum almost one-fourth as great as length of mesoscutellum; gaster broad, varying from as long as to one-fifth longer than thorax; apices of ovipositor sheaths not quite reaching apex of abdomen.

Male.—Length, 1.1–1.8 mm. Scape greatly enlarged, darkened anterior carina extending almost entire length of scape, pedicel small, beadlike, slightly longer than first funicle segment but narrower than it, second funicle segment one and one-half times as long as first, three apical segments equal in length, club slightly more than twice as long as fourth funicle segment; length of malar space three-fifths as great as height of compound eye; median length of propodeum one-third as great as length of mesoscutellum; gaster varying from one and one-tenth to one and one-quarter times as long as thorax.

Type locality.—Williamson River, Oreg.

Types.—U.S.N.M. No. 56238.

Described from the female holotype, male allotype, and 35 female and 15 male paratypes, reared from eggs of *Coloradia pandora* Blake, on *Pinus ponderosa*, June 24–July 28, 1924, by J. E. Patterson, under Hopkins U. S. No. 16247–C.

TETRASTICHUS HYLOTOMAE (Ashmead)

FIGURES 17, *a*; 21, *i*

Hyperteles hylotomae ASHMEAD, Can. Ent., vol. 20, p. 105, 1888.

Tetrastichus hylotomae (Ashmead) SCHWARZ, Proc. Ent. Soc. Washington, vol. 11, p. 107, 1909.

Iridescent green; antennae, mouthparts, trochanters, apices of femora, tibiae, and tarsi white or light yellow; male antennae sometimes entirely brown; female gaster often reddish brown, sometimes lighter at base.

Female.—Length, 2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of antennal scape reaching, or

slightly exceeding, level of vertex; scape almost three times as long as pedicel, second funicle segment slightly longer than first or third, club as long as scape; length of malar space two-thirds as great as height of compound eye; postocellar line slightly less than twice as long as ocellular. Pronotum with a slight femoral groove, much as in figure 17, *e*; one row of bristles present at each lateral margin of mesopraescutum, this sclerite one-fifth wider than long; submarginal vein of forewing bearing one dorsal bristle; hindwing blunt at apex, width of fringe at posterior margin one-sixth as great as width of wing at hamuli. Propodeum strongly shagreened, its mesal length one-third as great as length of mesoscutellum, both median and paraspicular carinae present; spiracles almost touching anterior margin of propodeum; gaster and thorax equal in length; gaster flattened at apex, cerci and spiracles of eighth segment ventral, rather than lateral or dorsal in position, apex of ovipositor sheaths not reaching apex of abdomen (fig. 21, *i*).

Male.—Length, 1.6 mm. First funicle segment slightly longer than pedicel, and shorter than second segment, third and fourth segments equal in length and each one-fourth longer than second; gaster slightly shorter than thorax. The male is extremely rare.

Type locality.—Southeastern Canada.

Types.—U.S.N.M. No. 11982.

Hosts.—Larvae of sawflies, *Arge dulciaria* (Say), *A. pectoralis* (Leach), (?) *Neodiprion* sp.

Distribution.—Illinois, Kentucky, Maryland, Maine, Manitoba, New Brunswick, Ontario, Quebec, Rhode Island, Virginia, West Virginia.

Remarks.—This species is evidently quite closely related to the European species, *T. atrococculeus* (Nees), which also parasitizes *Arge* larvae.

TETRASTICHUS ASPARAGI Crawford

FIGURES 17, *b*; 18, *b*; 20, *g*

Tetrastichus asparagi CRAWFORD, Proc. Ent. Soc. Washington, vol. 11, p. 150, 1909.—FERNALD, Rep. State Ent. Massachusetts, No. 22 (2), p. 73, 1910.—HOWARD, Journ. Econ. Ent., vol. 3, p. 258, 1910.—RUSSELL and JOHNSTON, Journ. Econ. Ent., vol. 5, p. 429, 1912.—JOHNSTON, Journ. Agr. Res., vol. 4, p. 303, 1915.—ROSS, Agr. Gaz. Canada, vol. 2, p. 1055, 1915; Ann. Rep. Ent. Soc. Ontario No. 46, p. 23, 1916.—GIRAULT, Proc. U. S. Nat. Mus., vol. 51, p. 128, 1916.—HEWITT, Canada Dept. Agr. Dominion Ent. Rep., 1917, p. 56.—CHITTENDEN, U. S. Dept. Agr. Farmers' Bull. 837, p. 8, 1917.—PAILLON, Ann. Epiphyt., vol. 4, p. 335, 1917.—ROSS and CAESAR, Ann. Rep. Ent. Soc. Ontario, No. 50, p. 101, 1920.—BRITTON, Connecticut State Agr. Exp. Stat. Bull. 234, p. 174, 1922.—CHITTENDEN, Oregon Board Hort. Bienn. Rep. No. 17, p. 187, 1923.—FELT, Rep. State Ent. New York, No. 35, p. 92, 1923.—LEONARD, New York (Cornell) Agr. Exp. Stat. Mem. 101, p. 984, 1928.—DRAKE, Iowa Agr. Exp. Stat. Circ. 134, p. 5, 1932.—BEAULNE, Quebec Soc. Protect. Plants Ann. Rep., 1935, p. 59.—BURKS, Ann. Ent. Soc. Amer., vol. 31, p. 159, 1938.

Iridescent blue-green; sometimes scape and pedicel of antennae, anterior trochanters usually, apices of femora, tibiae, and basal segments of tarsi white or light yellow; abdomen slightly lighter at base.

Female.—Length, 1.8–2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of vertex; all funicle segments equal in length and each slightly longer than pedicel; club as long as two funicle segments; malar space two-thirds height of compound eye; postocellar line one and one-third times as long as ocellular. Mesopraescutum wider than long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; marginal vein three times as long as stigmal; apex of hindwing blunt, width of fringe at posterior margin one-sixth width of wing at hamuli. Surface of propodeum shagreened, lateral carinae present; median length of propodeum one-half length of mesoscutellum; spiracles not quite touching anterior margin of propodeum; gaster as long as thorax, apices of sheaths not reaching apex of abdomen.

Male.—Unknown and probably does not exist; this species has been reared many times and has always been found to be parthenogenetic.

Type locality.—Amherst, Mass.

Types.—U.S.N.M. No. 12676.

Host.—The asparagus beetle, *Crioceris asparagi* (Linnaeus).

Distribution.—Commonly distributed in eastern and central United States and Canada, wherever asparagus is grown. Occurs also in Europe.

TETRASTICHUS FLORA (Girault), new combination

FIGURE 18, *c*

Aprostocetus flora GIRAULT, New chalcid flies, p. 3, 1917.

Epitetrastichus tricolor GIRAULT, Descriptiones stellarum novarum, p. 9, 1917
[not *Tetrastichus tricolor* Ashmead] (New synonymy.)

Varying from yellow and brown to almost entirely black; antennae usually, head, except areas surrounding ocelli and on occiput, venter of thorax, metacoxae, and basal half to two-thirds of abdomen yellow; femora, tibiae, and tarsi white; male mostly brown.

Female.—Length, 1.25–1.4 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape flattened, reaching level of anterior ocellus, first funicle segment three-quarters as long as pedicel, all funicle segments equal in length, club one and one-half times as long as pedicel; length of malar space two-thirds height of compound eye; postocellar line equal in length to ocellular. Each lateral angle of pronotum produced in a minute point (fig. 18, *e*); mesopraescutum as wide as long and bearing one pair of bristles,

median carina vague or wanting; submarginal vein of forewing with one dorsal bristle, hindwing acute at apex, fringe at posterior margin one-half width of wing at hamuli; anterior scutellar bristles longer than posterior ones. Surface of propodeum almost smooth, mesal length one-half length of mesoscutellum; median carina only present; spiracles contiguous with anterior margin; gaster usually short, broad, shorter than thorax, although sometimes slightly elongate.

Male.—Length, 1.2 mm. Scape broadened from near base to apex, with darkened anterior carina extending almost entire length of scape; first funicle segment three-fourths as long as pedicel, second segment equal to pedicel, third and fourth equal and each one-eighth longer than second; club slightly longer than three distal funicle segments; gaster shorter than thorax.

Type locality.—Jacksonville, Fla.

Types.—U.S.N.M. No. 21017.

Host.—The boxwood leaf miner, *Monarthropalpus buxi* (Laboulbene).

Distribution.—District of Columbia, Florida, Maryland, Tennessee.

TETRASTICHUS HILLMEADIA (Girault), new combination

Ootetrastichus hillmeadia GIRAULT, Chalcidoidea nova Marilandensis, pt. 3, p. 2, 1917.

Thorax iridescent blue-green; legs white; base of abdomen white, distal part brown and slightly iridescent.

The single available specimen of this species is in such poor condition that the character given here may be shown, when additional material is available, to be partly or wholly incorrect.

Female.—Length, approximately 1.0 mm. First funicle segment narrower than second, but slightly longer, second and third segments equal in length, club twice as long as pedicel; length of malar space one-half as great as height of compound eye; pronotum with an indistinct femoral groove; only one bristle at each lateral margin of mesopraescutum; submarginal vein of forewing apparently with one dorsal bristle; hindwing acute at apex; surface of propodeum smooth, median carina present, paraspircular carinae absent; gaster one and one-half times as long as thorax.

Male.—Unknown.

Type locality.—Glenn Dale, Md.

Type.—U.S.N.M. No. 21540. (Specimen in very poor condition.)

Host.—Unknown.

Distribution.—Maryland.

TETRASTICHUS SOLIDAGINIS, new species

Head, thoracic pleura and sternum, and gaster dull brown; dorsum of thorax and propodeum shining black; antennal pedicel and fla-

gellum, bases of coxae, and apical segment of each tarsus brown, all other parts of legs and antennal scape light yellow.

Female.—Length, 1.6–1.8 mm. Antennae inserted at level of ventral margins of compound eyes and almost in center of frons; apex of scape slightly exceeding level of vertex; pedicel two-thirds as long as first funicle segment, second segment one-sixth longer than first, third equal to first, club twice as long as third funicle segment; length of malar space four-fifths as great as height of compound eye; ocellocular line one and one-half times as long as postocellar. Mesopraescutum as long as wide and bearing one bristle at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin one-half as wide as wing at hamuli. Surface of propodeum shagreened, paraspicular carinae present; mesal length of propodeum one and one-half times as long as metanotum and one-third as long as mesoscutellum; spiracles separated from anterior margin of propodeum by a space one-half as great as length of a spiracle; gaster broad near base, acute at apex (flattened in dry specimens), longer than thorax.

Male.—Length, 1.3 mm. Funicle segments bearing conspicuously long setae on enlargements near bases; pedicel and first funicle segment equal in length, second segment one-third longer than first, third slightly longer than second, fourth equal to second; club as long as third and fourth segments combined; gaster equal to thorax in length.

Type locality.—Probably Utah.

Types.—U.S.N.M. No. 56239.

Described from five female and two male specimens; holotype female, allotype male, and four female and one male paratypes, said to have been reared from goldenrod gall made by *Eurosta solidaginis* (Fitch), under Bureau of Entomology No. 2493⁰³, by H. K. Morrison.

Remarks.—This species probably is not a primary parasite of *Eurosta solidaginis*.

TETRASTICHUS PULCHRIVENTRIS (Girault), new combination

Ncomphaloidella pulchriventris GIRAULT, Can. Ent., vol. 48, p. 101, 1916.

Head and thorax very dark brown, almost black, faintly iridescent under strong light; gaster almost entirely white, brown at dorsolateral margins; legs, except bases of coxae, light yellow or white; middle femora partly brown.

Female.—Length, 1.5 mm. Pedicel two-thirds as long as first funicle segment, all funicle segments equal in length; club slightly shorter than second and third funicle segments combined. Mesopraescutum wider than long and bearing a single pair of bristles; submarginal vein of forewing with one dorsal bristle; apex of hind-

wing acute, fringe at posterior margin almost as wide as wing at hamuli. Mesoscutellum two and one-half times as long as propodeum at meson, and mesal lengths of metanotum and propodeum equal; surface of propodeum slightly shagreened, paraspircular carinae present; propodeal spiracles nearly touching anterior margin; gaster one and three-fourth times as long as thorax.

Male.—Unknown.

Type locality.—Glenn Dale, Md.

Types.—U.S.N.M. No. 19915.

Host.—Unknown.

Distribution.—Maryland.

Remarks.—This species is known only from the unique type; additional material will very likely show variation in the color of the legs and abdomen.

TETRASTICHUS ULYSSES (Girault)

Aprostocetus ulysses GIRAULT, Bull. Brooklyn Ent. Soc., vol. 11, p. 112, 1916.

Head and thorax dark brown, almost black, faintly iridescent under strong light, abdomen almost entirely white, brown at dorso-lateral margins; legs, except bases of coxae, white.

Female.—Length, 1.2 mm. Pedicel equal in length to first funicle segment, second slightly longer than first, club slightly longer than second and third funicle segments combined. Mesopraescutum one and one-half times as wide as long and bearing one bristle at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin almost as wide as wing at hamuli. Mesal length of propodeum two-fifths length of mesoscutellum, mesal length of propodeum and metanotum equal; surface of propodeum faintly shagreened, paraspircular carinae present; propodeal spiracles almost touching anterior margin; gaster one and one-half times as long as thorax.

Male.—Unknown.

Type locality.—Glenn Dale, Md.

Types.—U.S.N.M. No. 20445. (Specimens distorted and broken.)

Host.—Unknown.

Distribution.—Maryland.

Remarks.—This species is known only from the two type specimens, and these specimens are in such poor condition that positive assignment of this specific name is difficult. More material might show this species to be the same as *ainsliei* Gahan.

TETRASTICHUS SEMILONGIFASCIATUS (Girault), new combination

Necomphatoidella semilongifasciatus GIRAULT, Societas Entomologica, vol. 31, p. 35, 1916.

Head and thorax shining black; gaster almost entirely white, brown at dorsolateral margins; bases of coxae, anterior and middle femora partly, and apical segment of each tarsus brown, other parts of legs white.

Female.—Length, 1.8 mm. Pedicel two-thirds as long as first funicle segment; second one-third longer than first, third slightly longer than first, club as long as first and second segments combined. Mesopraescutum two-thirds as long as wide and bearing one bristle at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin almost as wide as wing at hamuli. Mesal length of propodeum two-fifths as great as length of mesoscutellum, mesal length of propodeum greater than mesal length of metanotum; propodeum shagreened, paraspiracular carinae present, propodeal spiracles not quite touching anterior margin; gaster more than twice as long as thorax.

Male.—Unknown.

Type locality.—Glenn Dale, Md.

Type.—U.S.N.M. No. 19990.

Host.—Unknown.

Distribution.—District of Columbia, Maryland.

TETRASTICHUS AINSLIEI Gahan

FIGURE 20, *h*

Tetrastichus ainsliei GAHAN, Proc. U. S. Nat. Mus., vol. 53, p. 214, 1917; U. S. Dept. Agr. Misc. Publ. 174, p. 144, 1933.

Neomphaloidella mediogutta GIRAULT, Ent. News, vol. 28, p. 255, 1917. (New synonymy.)

Head and thorax very dark brown or black; antennae, legs (except bases of coxae), and base of abdomen white; apex of abdomen and darkened parts of legs brown, abdomen sometimes almost entirely white.

Female.—Length, 1.2–1.5 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of vertex, second funicle segment slightly longer than first, club as long as two apical funicle segments combined; length of malar space three-fifths height of compound eye. Only one pair of praescutal bristles present; mesopraescutum wider than long; submarginal vein of forewing with one dorsal bristle; hindwing acute at apex, fringe at posterior margin one-half width of wing at hamuli. Surface of propodeum shagreened; mesal length of propodeum one-third maximum length of mesoscutellum; both median and paraspiracular carinae present on propodeum; propodeal spiracles near to but not quite touching anterior margin; gaster from one and one-quarter to one and one-half times as long as thorax.

Male.—Length, 1.1–1.2 mm. First funicle segment one-fifth longer than pedicel, second, third, and fourth equal in length and each one-fifth longer than first, funicle segments enlarged near bases and bearing setae twice as long as segments, as in figure 16, *l*; club as long as two apical funicle segments; gaster equal in length to thorax.

Type locality.—Elk Point, S. Dak.

Types.—U.S.N.M. No. 20394.

Hosts.—Larvae of *Mordellistena pustulata* Melsheimer, *Mordellistena* sp., *Cylindrocopturus adspersus* (LeConte), and, rarely, the Hessian fly, *Phytophaga destructor* (Say).

Distribution.—Illinois, Iowa, Kansas, Maryland, New York, North Dakota, South Dakota, Virginia.

TETRASTICHUS WHITMANI (Girault), new combination

FIGURE 18, *d*

Aprostocetus whitmani GIRAULT, Ann. Ent. Soc. Amer., vol. 9, p. 296, 1916.

Aprostocetus marilandicus GIRAULT, Ent. News, vol. 28, p. 21, 1917. (New synonymy.)

Head and thorax black, noniridescent; apex of abdomen and darkened parts of legs, brown; apices of coxae, bases and apices of fore and middle femora, hind femora, all tibiae, basal segments of tarsi, and base of gaster light yellow or white.

Female.—Length, 2.0 mm. All funicle segments subequal in length; apex of scape reaching level of dorsal margin of anterior ocellus; length of malar space one-half height of compound eye. Mesopraescutum with one bristle at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute. Surface of propodeum shagreened; paraspircular carinae present; mesal length of propodeum one-sixth length of mesoscutellum; gaster one and three-quarters times as long as thorax.

Male.—Length, 1.8 mm. First and second funicle segments equal and each slightly shorter than third segment, third and fourth equal, funicle segments semiquadrate and without long setae, as in figure 16, *j*; gaster equal in length to thorax.

Type locality.—St. Paul, Minn.

Types.—U.S.N.M. No. 19936.

Host.—Eggs of leaf beetle, *Physonota unipunctata* (Say).

Distribution.—Maryland, Minnesota, South Dakota.

Remarks.—The characters of the male antennae show conclusively that this species and *ainsliei* Gahan are different; the differentiation of the females is, however, quite difficult.

TETRASTICHUS GELASTUS, new species

Black, with very faint iridescent reflections, area of head around mouthparts, base of gaster, front and middle coxae, and inner side of hind coxae, trochanters, and most of femora tan or brown; antennae, bases and apices of femora, and tibiae and tarsi light yellow or white.

Female.—Length, 1.8 mm. Antennae inserted dorsad of level of ventral margins of compound eyes, apex of scape not reaching level of anterior ocellus; first funicle segment one and one-half times as long as pedicel, second segment as long as pedicel, third segment slightly shorter than second, club twice as long as second funicle segment; length of malar space one-half as great as height of compound eye; a broad, rather poorly defined groove extending obliquely from antennal bases to ventral margins of compound eyes; postocellar line one and one-half times as long as ocellocular; interocellar triangle with several large, closely set punctures. Mesopraescutum with several longitudinal rugae on median area, confused, somewhat oblique and very irregular, elongate punctures on lateral areas, and two or three irregular rows of bristles present at each lateral margin; inner triangular part of scapula almost smooth, remainder of scapula strongly sculptured; mesoscutellum with deep, irregular, somewhat transverse folds on median sector, two lateral sectors with longitudinal rugae principally, small dorsal area of mesepisternum almost smooth, rest of thoracic pleuron strongly sculptured; submarginal vein of forewing with three or four dorsal bristles, stigmal vein short, slightly less than one-fourth as long as marginal vein; apex of hindwing blunt, fringe at posterior margin one-third as wide as wing at hamuli; metacoxa with an irregular longitudinal carina along outer dorsal and ventral margins. Surface of propodeum strongly sculptured, median, paraspiracular, and oblique carinae present, area between spiracle and paraspiracular carina extremely wide, spiracles contiguous with anterior margin of propodeum; surface of gaster smooth, one and one-quarter times as long as thorax.

Male.—Unknown.

Type locality.—Lutz, Fla.

Types.—U.S.N.M. No. 56240.

Described from the female holotype and three female paratypes, reared from nymphs of a psyllid, *Trioza* sp., on Chinese elm, June 18, 1939, by W. Kersey.

TETRASTICHUS MALACOSOMAE Girault

Tetrastichus malacosomae GIRAULT, Insecutor Inscitiae Menstruus, vol. 4, p. 110, 1916.—PORTER, Ent. News, vol. 28, p. 186, 1917.—LEONARD, New York (Cornell) Agr. Exp. Stat. Mem. 101, p. 984, 1928.

Black, or sometimes very dark brown, with iridescent blue or blue-green reflections; antennae yellow and brown; trochanters, basal three-fourths of femora, and often hind tibiae brown; apices of femora, front and middle tibiae, and tarsi white or yellow; abdomen sometimes brown at base.

Female.—Length, 1.1–1.5 mm. Antennae inserted at level of ventral margins of compound eyes; scape broad and short, only slightly more than twice as long as pedicel, apex of scape not reaching level of anterior ocellus, first funicle segment slightly shorter than second or third, latter two each slightly shorter than pedicel, club twice as long as pedicel; malar space one-half height of compound eye; postocellar line three times as long as ocellular. Mesopraescutum one-third wider than long and usually with one row of bristles at each lateral margin, a partial second row sometimes present; marginal vein of forewing with two dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-third width of wing at hamuli; scutellar grooves vague anteriorly. Thorax wide, abdomen elongate and narrow; propodeum extremely short so that abdomen appears broadly joined to thorax; surface of propodeum almost smooth, median carina vague or wanting entirely; mesal length of propodeum one-fifth length of mesoscutellum; propodeal spiracles large, almost contiguous with anterior margin; gaster long, slender, twice as long as thorax.

Male.—Length, 0.8–1.1 mm. Scape with a darkened anterior carina two-thirds as long as scape; first funicle segment two-thirds as long as second, following three segments equal in length, funicle segments moniliform and without long setae; club almost three times as long as fourth funicle segment; gaster equal in length to thorax.

Type locality.—Maxwell, N. Mex.

Types.—U.S.N.M. No. 20446.

Hosts.—Eggs of tent caterpillars, *Malacosoma fragilis* Stretch, *M. americana* (Fabricius), *M. disstria* Huebner.

Distribution.—Delaware, Idaho, Massachusetts, Nebraska, New Mexico, New York, Oregon, Pennsylvania.

TETRASTICHUS BALDUFI, new species

Brown; antennae, trochanters, bases and apices of femora, tibiae, basal segments of tarsi, and usually spot at base of gaster white or yellowish; base of gaster may be tan, rather than yellow or white.

Female.—Length, 1.0–1.4 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus; first funicle segment slightly shorter than second, third and second equal in length; club two and one-half times as long as third funicle segment; length of malar space one-half height of compound eye; malar suture curved; postocellar line one and one-half times as

long as ocellocular. Mesopraescutum as wide as long and bearing two bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin one-half as wide as wing at hamuli. Mesal carina of propodeum wanting or only faintly indicated, paraspiracular carinae wanting, surface of propodeum smooth or very faintly roughened, mesal length of propodeum one-fourth length of mesoscutellum; propodeal spiracles almost touching anterior margin; gaster one-third longer than thorax.

Male.—Length, 1.0–1.2 mm. Scape three times as long as pedicel; funicle segments bearing conspicuously long bristles near bases, first funicle segment equal in length to pedicel, second segment one-eighth longer than first, third and fourth equal and each one-eighth longer than second, club one-fifth longer than scape; gaster slightly shorter than thorax.

Type locality.—Urbana, Ill.

Types.—U.S.N.M. No. 56241.

Described from the female holotype, male allotype, and many male and female paratypes reared from oakleaf gall of *Neuroterus verrucarum* (Osten Sacken), June 25, 1927, by W. V. Balduf; many additional specimens reared May 11–June 17, 1927, and May 1–26, 1928. All specimens reared from galls collected from the same tree.

TETRASTICHUS DYRUS, new species

FIGURE 16, *h*; 20, *e*

Black; apices of antennal scape and pedicel, flagellum, sometimes apices of coxae, bases and apices of femora, tibiae, and basal three segments of tarsi light yellow or white; antennal flagellum and tibiae sometimes very slightly darkened, femora occasionally almost entirely yellow.

Female.—Length, 0.9–1.1 mm. Antennae inserted at level of ventral margins of compound eyes, apex of scape not quite reaching level of anterior ocellus, pedicel enlarged at apex and slightly longer than first funicle segment, each funicle segment shorter and very slightly wider than segment proximad of it, club long, relatively slender, three times as long as third funicle segment (fig. 16, *h*); length of malar space two-thirds as great as height of compound eye; postocellar line twice as long as ocellocular. Mesopraescutum with two long bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle, marginal vein four and one-half times as long as stigmal; apex of hindwing acute, fringe at posterior margin two-thirds as wide as wing at hamuli. Surface of propodeum obscurely reticulated, paraspiracular carinae absent, well-marked oblique ones usually present, spiracle almost contiguous with anterior margin of propodeum; median length

of propodeum one-half as great as length of mesoscutellum; gaster as long as or slightly longer than thorax.

Male.—Length, 1.1 mm. Darkened anterior carina of scape minute, located at a point one-third the distance from apex to base of scape, pedicel one and two-thirds times as long as first funicle segment, second segment almost twice as long as first, third and fourth equal in length and each slightly longer than second, club two and one-half times as long as fourth funicle segment; funicle segments bearing conspicuously long bristles on elevations near bases of segments; marginal vein of forewing three and one-half times as long as stigmal, fringe at posterior margin of hindwing one-half as wide as wing at hamuli; gaster slightly longer than thorax.

Type locality.—Fairy Lake, Gallatin County, Mont.

Types.—U.S.N.M. No. 56242.

Described from 1 male and 10 female specimens, as follows: Female holotype, male allotype, and 1 female paratype from the type locality, reared from *Trioza* sp. nymphs on *Angelica lyalli*, September 4, 1939. D. J. Pletsch; 2 female paratypes having the same locality, date and collector as above, but taken sweeping vegetation infested with undetermined psyllids; 5 female paratypes, same locality, date and collector, but reared from *Trioza* sp. nymphs on *Thalictrum occidentale*; 10 female paratypes, Bozeman, Mont., reared from *Trioza* sp. nymphs on *Salix* sp., September 23, 1939, D. J. Pletsch.

TETRASTICHUS TRIOZAE, new species

FIGURES 16, *i*, 1; 20, *d*

Black, noniridescent; apices of scape and pedicel and variable areas of flagellum, wing veins, bases and apices of femora and tibiae, and basal segments of tarsi white or light yellow; anterior tibiae usually darkened only on outer face; base of gaster sometimes tan; antennae and legs of males sometimes entirely white or light yellow.

Female.—Length, 0.95–1.05 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; scape short, its apex reaching a point only two-thirds the distance from clypeal margin to anterior ocellus; pedicel one-half as long as scape, each funicle segment shorter and wider than that proximad of it; third segment three-fourths as long and one and one-third times as wide as first, maximum width of club almost twice as great as width of third funicle segment (fig. 16, *i*). Mesopraescutum with two bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle, stigmal vein one-third as long as marginal; apex of hindwing acute, fringe at posterior margin one-half as wide as wing at hamuli. Surface of propodeum almost smooth, faintly reticulated and with median carina

obsolescent or wanting, paraspiracular carinae absent, a few vague wrinkles present at posterior margin; spiracles large, contiguous with anterior margin, mesal length of propodeum one-third length of meso-scutellum; gaster and thorax equal in length.

Male.—Length, 0.7–0.9 mm. Antennal scape broadened from base to apex, twice as long as pedicel, each funicle segment bearing long setae on a basal elevation, first segment shorter than others, all funicle segments and club equal in width; fringe at posterior margin of hind-wing one-half as wide as wing at hamuli; gaster equal in length to thorax; male genitalia prominent, apparently never wholly retracted into abdomen, sagittae elongate, acutely pointed, aedeagus long, narrow, acute at apex.

Type locality.—Five miles northwest of Marinette, Ariz.

Types.—U. S. N. M. No. 56243.

Described from many male and female specimens, as follows: Female holotype, male allotype, and 5 female and 6 male paratypes, reared from nymphs of *Paratrioza cockerelli* (Sulc), April 9, 1935, by V. E. Romney; 17 female and 13 male paratypes, from 10 miles north of Phoenix, Ariz., reared from nymphs of *Paratrioza cockerelli*, April 1935, V. E. Romney; 3 females, Mesilla Valley, N. M., reared from *Paratrioza cockerelli* (?), October 1923, Chittenden No. 6900; 1 male, Hollister, Idaho, June 2, 1931, D. E. Fox; 1 male, Hobbs Butte, Idaho, June 11, 1931, in wind-vane trap; 2 females, Lawrence, Kans., reared from (?) *Calophya nigripennis* Riley, 1930, P. B. Lawson; 3 females, Spanaway, Wash., reared from infested *Amelanchier*-berry material, August 26, 1933, W. Baker; 5 females and 4 males, Billings, Mont., September 2–3, 1939, from *Paratrioza cockerelli* on tomato, H. B. Mills; 23 females and 29 males, Billings, Mont., September 11, 1939, from *Paratrioza cockerelli* nymphs, D. J. Pletsch; 9 females and 6 males, Colorado, February 12, 1940, from *Paratrioza cockerelli* on potato, Hill and Tate; 1 female and 5 males, Garden Grove, Calif., September 17, 1928, A. C. Davis; and 12 females and 2 males, Fort Collins, Colo., December 13, 1932, Colo. Agr. Coll. No. 5319. Many additional males and females, not included in the type series, were reared at Billings and Bozeman, Mont., from nymphs of *Paratrioza cockerelli* during September 1939 by D. J. Pletsch. Other specimens, not included in the type series, are from Scottsbluff, Nebr., reared from *Paratrioza cockerelli* on potato, August 20, 1939, by John Standish.

Remarks.—This species and *T. dryus* evidently are closely related to *Tetrastichus dryi* Waterston, which parasitizes "*Trioxa citri*" in Kenya Colony, Africa, and *Tetrastichus radiatus* Waterston, parasitic on *Euphalerus citri* (Kuwayama) in the Punjab, British India. All four species apparently possess the same general kind of remarkable male genitalia.

TETRASTICHUS OVIPRANSUS Crosby and Leonard

FIGURE 20, c

Tetrastichus ovipransus CROSBY and LEONARD, Ent. News, vol. 28, p. 368, 1917.

Shining black with an iridescent blue cast; antennae yellow or brown, apices of femora, tibiae, and bases of tarsi light yellow or white.

Female.—Length, 0.9–1.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not quite reaching level of anterior ocellus, second funicle segment slightly longer than first, second and third equal in length, club as long as funicle; malar space two-thirds height of compound eye; ocellocular line one-half as long as postocellar. Mesopraescutum wider than long and bearing three bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle, stigmal vein with an apical spur (fig. 20, c); outer margin of wing with a fringe of long setae; hindwing acute at apex. Propodeum faintly shagreened, rather faint median and paraspicular carinae present; mesal length of propodeum one-third that of mesoscutellum; propodeal spiracles almost round and separated from anterior margin by a space equal to diameter of a spiracle; gaster as long as thorax.

Male.—Unknown.

Type locality.—Norfolk, Va.

Types.—Cornell University Collection No. 76.

Host.—Eggs of the sumac leaf beetle, *Blepharida rhois* (Forster).

Distribution.—Virginia.

TETRASTICHUS XANTHOMELAENAE (Rondani)

Oomyzus gallerucae RONDANI [not Fonscolombe], Bol. Comm. Agr. Parma, vol. 3, p. 137, 1870; Bol. Soc. Ent. Ital., vol. 3, p. 53, 1872; vol. 9, p. 191, 1877.

Oomyzus xanthomelaenae RONDANI, Repertorio degli insetti parassiti e della loro vittime, pt. 2, p. 16, 1872.

Tetrastichus xanthomelaenae (Rondani) MARCHAL, Bull. Soc. Ent. France, 1905, pp. 64, 81.—Howard, Journ. Econ. Ent., vol. 1, p. 281, 1908.—MASI, Bol. Portici Scuola Super. Agr., Lab. Zool. Gen. e Agr., vol. 3, p. 131, 1908.—SMITH, Rep. State Ent. New Jersey, 1908, p. 312; 1909, p. 411.—BRITTON, Rep. State Ent. Connecticut, No. 8, p. 821, 1909.—SILVESTRI, Bol. Portici Scuola Super. Agr., Lab. Zool. Gen. e Agr., vol. 4, p. 271, 1910.—HOWARD and FISKE, U. S. Bur. Ent. Bull. 91 (n. s.), p. 40, 1911.—KURDJUMOV, Russ. Ent. Obozr. (Rev. Russe Ent.), vol. 13, p. 253, 1913.—HOWARD, Journ. Econ. Ent., vol. 10, p. 504, 1917.—MARCHAL and FOEX, Ann. Epiphyt., vol. 6, p. 14, 1919.—PARKER, Bull. Soc. Ent. France, vol. 93, p. 293, 1924.—HOWARD, Rep. Chief U. S. Bur. Ent., 1926, p. 28.—PROVASOLI, Bol. Lab. Zool. Milano, vol. 3, p. 53, 1932.—HRISAFI, Notat. Biol., vol. 2, p. 37, 1934.—STRONG, Rep. Chief U. S. Bur. Ent., 1935, p. 60.—FLANDERS, Journ. Econ. Ent., vol. 29, p. 1024, 1936.—BERRY, Journ. Agr. Res., vol. 57, p. 859, 1938.

Dark, iridescent blue-green or green; antennae usually, apices of femora, tibiae, and bases of tarsi white or light yellow.

Female.—Length 0.75 mm. Antennae inserted at level of ventral margins of compound eyes; scape short, its apex not reaching level of anterior ocellus; all funicle segments equal in length, and each three-quarters as long as pedicel, club as long as funicle; postocellar line twice as long as ocellocular. Mesopraescutum wider than long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin one-half as wide as wing at hamuli. Surface of propodeum almost smooth, only very faintly reticulated; paraspircular carinae wanting; mesal length of mesoscutellum three and one-half times as great as mesal length of propodeum; propodeal spiracles contiguous with anterior margin; length of gaster equal to length of thorax, gaster somewhat rounded, and flattened in dry specimens.

Male.—Length, 0.65 mm. Scape with a minute anterior carina; pedicel one-third as long as scape and greatly enlarged at apex, second, third, and fourth funicle segments equal, first segment one-half as long as second; funicle segments bead-like and without long bristles, club as long as three distal funicle segments.

Type locality.—Parma, Italy.

Types.—Probably in the Pondani collection in Parma, Italy.

Host.—Eggs of *Galerucella xanthomelaena* (Schrank), the elm leaf beetle.

Distribution.—Western and central Europe; Massachusetts, New Jersey, New York.

TETRASTICHUS COMPSIVORUS Crawford

Tetrastichus compsivorus CRAWFORD, *Insecutor Inscitiae* Menstruus, vol. 2, p. 180, 1914.

Very dark brown, almost black; trochanters, apices of femora and tibiae, and basal segments of middle and hind tarsi white or light yellow.

Female.—Length, 1.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus, pedicel slightly less than one-half as long as scape, first and second funicle segments equal and each slightly shorter than pedicel, third segment slightly shorter than second, club equal in length to scape, malar space three-fifths height of compound eye. Mesopraescutum with one row of bristles at each lateral margin; submarginal vein of forewing bearing one dorsal bristle, outer margin of forewing with a fringe of long setae; apex of hindwing acute. Surface of propodeum almost smooth, slightly reticulated, median carina vague, paraspircular carinae wanting; mesal length one-third

length of mesoscutellum; propodeum and metanotum of equal length at meson; gaster slightly longer than thorax.

Male.—Length, 0.9 mm. Funicle segments slightly enlarged near bases, and bearing setae slightly longer than segments; pedicel slightly longer than first funicle segment, first and second funicle segments equal in length; club one-fourth longer than pedicel and first funicle segment; gaster and thorax equal in length.

Type locality.—Chickasha, Okla.

Types.—U.S.N.M. No. 19067. (Specimens in very poor condition.)

Host.—Eggs of snout beetle, *Compsus auricephalus* (Say).

Distribution.—Mississippi, Oklahoma, Texas.

TETRASTICHUS EUPLECTRI Gahan

Tetrastichus euplectri GAHAN, Proc. U. S. Nat. Mus., vol. 48, p. 167, 1914.—
VICKERY, Journ. Econ. Ent., vol. 8, p. 391, 1915.

Body mostly iridescent blue-green; base and apex of abdomen somewhat brown, legs (except coxae) and base of gaster of male white.

Female.—Length, 1.5 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of vertex; funicle segments long, first one and two-thirds times as long as pedicel, second twice as long as pedicel, third as long as first, club twice as long as first funicle segment; length of malar space one-half height of compound eye; postocellar line one and two-thirds times as long as ocellocular. Mesopraescutum two-thirds as long as wide and bearing three bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; hindwing acute at apex, fringe at posterior margin one-third as wide as wing at hamuli. Propodeum shagreened, mesal length slightly less than one-half as great as length of mesoscutellum; propodeum bearing median, paraspiracular, and oblique carinae, as in figure 21, *d*; propodeal spiracles not quite touching anterior margin; gaster nearly twice as long as thorax.

Male.—Length, 1.1 mm. Scape enlarged and bearing a darkened anterior carina one-half as long as scape, first funicle segment equal in length to pedicel, second, third, and fourth equal in length and each one-quarter longer than pedicel, funicle segments enlarged at base and narrowed toward apex, and bearing long setae, club as long as two distal funicle segments; gaster equal in length to thorax.

Type locality.—Tallulah, La.

Types.—U.S.N.M. No. 18338.

Hosts.—*Euplectrus plathypenae* Howard, *Meteorus* sp., primary parasites on the larvae of various Lepidoptera.

Distribution.—Louisiana, Texas.

TETRASTICHUS AENEOVIRIDIS (Girault), new combination

Trichaporus aeneoviridis GIRAULT, Can. Ent., vol. 44, p. 75, 1912.—FRISON, Bull. Illinois Nat. Hist. Survey, vol. 16, p. 223, 1927.

Bright iridescent green, with occasional purple reflections; legs (except bases of coxae) entirely light yellow or white; antennae and area of head around mouthparts tan or yellowish.

Female.—Length, 1.8 mm. Apex of scape reaching level of vertex; second funicle segment slightly longer than first, third equal to first; mesopraescutum with four or five bristles at each lateral margin, median groove vague, almost obliterated; one dorsal bristle on submarginal vein of forewing; hindwing blunt at apex; surface of propodeum shagreened, paraspircular carinae present, spiracles separated from anterior propodeal margin by a space equal to diameter of spiracle.

Male.—Unknown.

Type locality.—Centralia, Ill.

Types.—Lectotype, paratypes, and metatypes in Illinois Natural History Survey Collection; paratypes, U.S.N.M. No. 12200.

Host.—This species was originally said to be a primary parasite of the larva of the apple-tree tent caterpillar, *Malacosoma americana* (Fabricius), but the insectary records in the Illinois Natural History Survey show that the specimens came from syrphid puparia.

Distribution.—Illinois.

TETRASTICHUS DIARTHROMYIAE Gahan

Tetrastichus diarthromyiae GAHAN, Proc. Ent. Soc. Washington, vol. 25, p. 65, 1923.—HAMILTON, Maryland Agr. Exp. Stat. Bull. 269, p. 23, 1924.

Shining black or very dark brown, sometimes faintly iridescent bluish or greenish; antennae usually, trochanters, bases and apices of femora, tibiae, and basal segments of middle and hind tarsi white or light yellow.

Female.—Length, 1.0–1.5 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus, first funicle segment three-quarters as long as second, third as long as first, club slightly more than twice as long as first funicle segment; length of malar space two-thirds height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum slightly wider than long and bearing three bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin one-half width of wing at hamuli. Surface of propodeum shagreened, mesal length one-fifth length of mesoscutellum, both median and paraspircular carinae present; propodeal spiracles near to but not quite touching anterior margin; gaster one and one-half times as long as thorax.

Male.—Unknown.

Type locality.—College Park, Md.

Types.—U.S.N.M. No. 25592.

Host.—The chrysanthemum gall midge, *Diarthronomyia hypogaea* (Loew).

Distribution.—Maryland.

TETRASTICHUS TIBIALIS (Ashmead)

Tetrastichodes tibialis ASHMEAD, Trans. Amer. Ent. Soc., vol. 21, p. 344, 1894.

Tetrastichus tibialis (Ashmead) GIRAULT, Societas Entomologica, vol. 31, p. 35, 1916 [not *Tetrastichus tibialis* Kurdjumov].

Body very dark brown, or black with faint iridescent green reflections; scape and part of pedicel of antennae, apices of femora, tibiae, and tarsi white.

Female.—Length, 1.4 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus, three funicle segments equal in length, club slightly shorter than two funicle segments combined; malar space three-fifths height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum wider than long, and each lateral margin with one row consisting of but three or four bristles; submarginal vein of forewing with one dorsal bristle; apex of hindwing acute, fringe at posterior margin one-half as wide as wing at hamuli. Surface of propodeum roughened; median, paraspicular, and oblique carinae present, as in fig. 21, *d*; median length of propodeum one-third as great as length of mesoscutellum; rudimentary petiole present; propodeal spiracles not quite contiguous with anterior margin; gaster equal in length to thorax.

Male.—Length, 1.2 mm. Funicle segments enlarged near bases and bearing setae slightly longer than the segments themselves; gaster slightly shorter than thorax.

Type locality.—Morgantown, W. Va.

Types.—U.S.N.M. No. 41341. (Specimens in very poor condition.)

Hosts.—*Apanteles* sp. parasitic on *Apatela americana* (Harris), the American dagger moth; *Apanteles* sp. parasitic on other, undetermined Lepidoptera.

Distribution.—Delaware, Ontario, West Virginia.

TETRASTICHUS SCOLYTI Ashmead

Tetrastichus scolyti ASHMEAD, Trans. Amer. Ent. Soc., vol. 21, p. 343, 1894.

Black with iridescent-green or blue-green cast; scape and ventral side of pedicel and flagellum, apices of femora and tibiae, and basal segments of tarsi white or yellow; setae of head may be white; basal parts of tibiae may be lighter in color than bases of femora.

Female.—Length, 2.0 mm. Antennae inserted at level of central margins of compound eyes, apex of scape not quite reaching level of anterior ocellus, funicle segments long, first one and one-half times as long as pedicel, second one and two-thirds as long as pedicel and third one and one-third times as long as pedicel, club twice as long as pedicel; malar space two-thirds height of compound eye; postocellar line one and one-third times as long as ocellocular. Mesopraescutum as long as wide and bearing one row of bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing blunt, fringe at posterior margin one-fifth as wide as wing at hamuli. Propodeum shagreened, mesal length one-third length of mesoscutellum, both median and paraspiracular carinae present, spiracles separated from anterior margin by a space equal to one-half length of a spiracle; gaster one and one-third times as long as thorax.

Male.—Unknown.

Type locality.—Morgantown, W. Va.

Types.—U.S.N.M. No. 41339. (Specimens in very poor condition.)

Host.—The shot-hole borer, *Scolytus rugulosus* Ratzeburg.

Distribution.—New Jersey, West Virginia.

TETRASTICHUS AGRILI Crawford

Tetrastichus agrili CRAWFORD, Insecutor Inscitiae Menstruus, vol. 2, p. 181, 1914.—LEONARD, New York (Cornell) Agr. Exp. Stat. Mem. 101, p. 984, 1928.

Black, with iridescent blue-green cast; mouthparts, scape, trochanters, tibiae, and tarsi white or light yellow.

Female.—Length, 3.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus, first funicle segment one-fifth longer than second, third five-sixths as long as second, club one and two-thirds times as long as third funicle segment; malar space two-thirds height of compound eye; postocellar line twice as long as ocellocular line. Pronotum with well-defined femoral grooves, as in figure 17, *e*; mesopraescutum as long as wide and bearing a single row of bristles at each lateral margin; submarginal vein of forewing with a single dorsal bristle; apex of hindwing blunt, fringe at posterior margin one-sixth or one-seventh as wide as wing at hamuli. Propodeum shagreened, mesal length one-fourth as great as length of mesoscutellum, both median and paraspiracular carinae present; spiracles almost touching anterior margin of propodeum; gaster long, narrow, acutely pointed, twice as long as thorax.

Male.—Unknown.

Type locality.—Geneva, N. Y.

Types.—U.S.N.M. No. 19068.

Host.—The sinuate pear tree borer, *Agilus sinuatus* Olivier.

Distribution.—New York.

TETRASTICHUS SCRIPTUS, new species

Dark, iridescent green, with antennal pedicel and flagellum, coxae, basal two-thirds of femora, and apical segment of each tarsus brown; antennal scape, trochanters, apices of femora, tibiae, and basal segments of tarsi light yellow.

Female.—Length, 1.4–1.8 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of vertex; pedicel slightly more than one-half as long as first funicle segment, first and second segments equal in length, third slightly shorter than second, club as long as second and third combined; length of malar space two-thirds as great as height of compound eye, postocellar line one and one-half times as long as ocellocular. Mesopraescutum bearing one row of bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing blunt, fringe at posterior margin one-third as wide as wing at hamuli; thoracic pleuron and bases of metacoxae shagreened. Surface of propodeum shagreened, strong median, paraspiracular, and oblique carinae present; mesal length of propodeum two-fifths as great as length of mesoscutellum; spiracles separated from anterior margin of propodeum by a space one-half as great as length of a spiracle; gaster longer than thorax, provided with rather inconspicuous setae on sides and venter.

Male.—Unknown.

Type locality.—Irvington, N. J.

Types.—U.S.N.M. No. 56244.

Described from the female holotype and four female paratypes reared from a primary parasite (*Euplectrus* sp.?) parasitic on the cottonwood leaf beetle, *Lina scripta* (Fabricius), by E. L. Dickerson in July.

TETRASTICHUS PRODUCTUS Riley

Tetrastichus productus RILEY, Proc. U. S. Nat. Mus., vol. 8, p. 419, 1885.—GAHAN, U. S. Dept. Agr. Misc. Publ. 174, p. 143, 1933 (this paper contains a bibliography complete through 1932).

Very dark brown, almost black, with iridescent green reflections; trochanters, tibiae, and tarsi white; antennae sometimes tan or yellow; mesal lobe of metanotum yellow.

Female.—Length, 2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not quite reaching level of anterior ocellus, first funicle segment slightly longer than second, second and third segments equal in length, club as long as last two funicle segments combined; length of malar space height of compound

eye; postocellar line one and one-half times as long as ocellocular. Mesopraescutum as long as wide, with one row of bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; hindwing blunt at apex, fringe at posterior margin one-fourth as wide as wing at hamuli. Surface of propodeum roughened; mesal length of propodeum three-eighths length of mesoscutellum; median, paraspiracular, and short, oblique carinae present, much as in figure 21, *d*; rudimentary petiole present; propodeal spiracles separated from anterior margin by a space equal to one-half length of a spiracle; gaster twice as long as thorax.

Male.—Length, 1.5 mm. Darkened anterior carina of scape two-thirds as long as scape; first funicle segment four-fifths as long as second segment, three distal segments equal in length, funicle segments enlarged near bases and bearing long setae, club as long as first three funicle segments; gaster equal in length to thorax.

Type locality.—Cadet, Mo.

Types.—U.S.N.M. No. 2796.

Host.—The Hessian fly, *Phytophaga destructor* (Say). (May be incorrect.)

Distribution.—Missouri.

TETRASTICHUS PARACHOLUS, new species

Very dark brown or black, with faint brassy iridescence; scape and apex of pedicel of antenna, apices of coxae, bases and apices of femora, tibiae, and tarsi white or light yellow.

Female.—Length, 1.5–1.8 mm. Entire body long and narrow. Antennae inserted at level of ventral margins of compound eyes; apex of scape not quite reaching level of ventral margin of anterior ocellus; first funicle segment slightly longer than second, second and third funicle segments equal in length and their combined lengths equal to that of club; ocellocular line two-thirds as long as postocellar. Mesopraescutum bearing one row of bristles at each lateral margin; submarginal vein of forewing with one dorsal bristle; apex of hindwing blunt, fringe at posterior margin slightly less than one-third as wide as wing at hamuli; entire surface of thoracic pleuron reticulated; metacoxae shagreened near base, smooth at apex. Surface of propodeum shagreened, strong median and paraspiracular carinae present; mesal length of propodeum one-third as great as length of mesoscutellum; propodeal spiracles separated from anterior margin by a space one-half as great as diameter of a spiracle; rudimentary petiole present, its dorsal surface faintly reticulated; gaster elongate, narrow, longer than thorax.

Male.—Length, 1.5 mm. Funicle segments enlarged near bases and provided with long setae; pedicel and first funicle segment equal in

length, three following segments equal in length and each one-fifth longer than first, club three times as long as first segment; gaster as long as thorax.

Type locality.—Vienna, Va.

Types.—U.S.N.M. No. 56245.

Described from 20 female and 4 male specimens, all said to have been reared from the goldenrod stem-gall moth, *Gnorimoschema gallaesolidaginis* (Riley): Holotype female and 9 female paratypes, Vienna, Va., May 17, 1911, R. A. Cushman; allotype male and 8 female and 3 male paratypes, Richmond, Va., G. W. Barber; 2 female paratypes, New Lisbon, N. J., May 15, 1931, E. P. Darlington. An additional lot of 14 females and 3 males, not included in the type series, were reared from *G. gallaesolidaginis* at Washington, D. C., March 22, 1886. These specimens were set aside as a new species by Ashmead and bear a manuscript name, but his description was never published.

Remarks.—Although said to have parasitized the goldenrod gall moth, this species may actually have come from some parasite or inquiline associated with that moth.

TETRASTICHUS TESSERUS, new species

Shining, jet black; area of head around mouthparts, base of antennal scape, and most of femora dark brown; bases and apices of femora, tibiae, and tarsi light yellow or white; apices of tarsi sometimes darkened; legs of male almost entirely yellow; old or teneral specimens may be brown rather than black. Surfaces of thorax and abdomen with strong, reticulate sculpturing, much as in figure 18, *c*.

Female.—Length, 1.6–2.1 mm. Antennae inserted dorsad of level of ventral margins of compound eyes; apex of scape surpassing level of vertex; pedicel slightly more than one-half as long as first funicle segment, second segment four-fifths as long as first, second and third equal in length, club one and one-half times as long as third funicle segment; length of malar space two-thirds as great as height of compound eye; postocellar line slightly longer than ocellocular, interocellar triangle usually with seven large, setigerous punctures. Mesopraescutum short, semiquadrate, as in figure 18, *c*, one row of bristles present at each lateral margin; submarginal vein of forewing with three or four dorsal bristles, marginal vein four times as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-third as wide as wing at hamuli; surface of propodeum shagreened, but paraspiracular carinae absent or only vaguely indicated, spiracles contiguous with anterior propodeal margin, median length of propodeum one-third as great as length of mesoscutellum; gaster twice as long as thorax.

Male.—Length, 1.6–1.7 mm. Anterior carina of scape extending almost the entire length of scape, pedicel and first funicle segment

equal in length, fourth segment twice as long as first, club two and one-half times as long as fourth funicle segment; funicle segments bearing conspicuously long bristles on enlargements near bases of segments; marginal vein of forewing three times as long as stigmal; gaster one and one-fourth times as long as thorax.

Type locality.—Midland County, Mich.

Types.—U.S.N.M. No. 56246.

Described from 9 females and 3 males, as follows: Holotype female, collected at the type locality, June 28, 1938, R. R. Dreisbach; 1 female paratype, collected at White Heath, Ill., June 13, 1939, P. C. Dirks; 4 female paratypes, collected at Arlington, Va.; 1 female paratype, Sergeant Bluff, Iowa, reared from *Asteromyia* sp. gall on goldenrod, C. N. Ainslie; allotype male and 1 female paratype, Sioux City, Iowa, reared from *Cecidomyia* sp. galls on goldenrod, 1917, C. N. Ainslie; and 1 female and 1 male paratypes, Sioux City, Iowa, reared from *Lasioptera* sp. galls on goldenrod, October 6, 1916, C. N. Ainslie.

Remarks.—Despite the apparent diversity of hosts, as indicated above, this species is very likely to be restricted to a single gall maker on goldenrod.

TETRASTICHUS FUMIPENNIS (Girault), new combination

FIGURES 13, *c*; 21, *a*

Neomphaloidella fumipennis GIRAULT, Chalcidoidea nova Marilandensis, pt. 1, p. 2, 1917.

Very dark, steel blue or shining black, teneral specimens brown; variable areas on scape, pedicel, apices of femora, tibiae, and basal segments of tarsi light yellow or white; mouthparts, apices of pedicel and flagellum, trochanters, basal two-thirds of femora, and apical segment of each tarsus brown; forewing sometimes with a vague brown cloud in basal half; surfaces of head, thoracic notum, and abdomen uniformly covered with scalelike shagreening (fig. 18, *c*).

Female.—Length, 1.3–1.5 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes, apex of scape reaching level of anterior ocellus; all funicle segments equal in length, and each as long as pedicel, club two and one-half times as long as pedicel; length of malar space four-fifths height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum wider than long, and bearing one or two somewhat irregular rows of bristles at each lateral margin (fig. 18, *c*); submarginal vein of forewing with two or three dorsal bristles, marginal vein twice as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-fourth as wide as wing at hamuli; surface of propodeum reticulated, median, paraspiracular, and oblique carinae present (fig. 21, *a*), mesal length of propodeum one-third length of mesoscutellum; propodeal spiracles

separated from anterior margin by a space one-half as great as length of a spiracle; gaster equal to or slightly longer than thorax; entire dorsum of gaster shagreened.

Male.—Length, 1.1 mm. Darkened anterior carina of scape two-thirds as long as scape; first funicle segment shorter than second; funicle segments enlarged near bases and bearing setae much longer than the segments themselves; gaster as long as thorax.

Type locality.—Glenn Dale, Md.

Type.—U.S.N.M. No. 20444. (Specimen in poor condition.)

Host.—Black blister leaf gall of *Asteromyia carbonifera* (Felt) on goldenrod; some specimens also were said to have been reared from the goldenrod gall moth, *Gnorimoschema gallaesolidaginis* (Riley), but this is probably an error.

Distribution.—District of Columbia, Illinois, Indiana, Iowa, Maryland, Virginia.

TETRASTICHUS HAGENOWII (Ratzeburg)

Entedon hagenowii RATZEBURG, Die Ichneumoniden der Forstinsekten . . . , vol. 3, p. 211, 1852.

Geniocerus hagenowii (Ratzeburg) KURDJUMOV, Russ. Ent. Obozr. (Rev. Russe Ent.) vol. 13, p. 249, 1913.—CRAWFORD, Proc. U. S. Nat. Mus., vol. 48, p. 584, 1915.

Blattotetrastichus hagenowi (Ratzeburg) GIRAULT, Ent. News, vol. 28, p. 257, 1917.

Tetrastichus hagenowi (Ratzeburg) ASHMEAD, Fauna Hawaiensis, vol. 1, p. 329, 1901.—FULLAWAY, Proc. Haw. Ent. Soc., vol. 2, p. 287, 1913.—GAHAN, Proc. U. S. Nat. Mus., vol. 48, p. 168, 1914.—SEVERIN and SEVERIN, Journ. Econ. Ent., vol. 8, p. 329, 1915.—MARLATT, U. S. Dept. Agr. Farmers' Bull. 658, p. 11, 1915.—MASI, Nov. Zool., vol. 24, p. 213, 1917.—SEIN, Puerto Rico Dept. Agr. and Comm. Circ. 64, p. 5, 1923.—TIMBERLAKE, Proc. Haw. Ent. Soc., vol. 5, p. 442, 1924.—WILLIAMS, Handbook of insects, p. 256, 1931.

Tetrastichodes floridanus ASHMEAD, Proc. Amer. Ent. Soc., vol. 14, p. 203, 1887.

Tetrastichoides browni ASHMEAD, Proc. U. S. Nat. Mus., vol. 29, p. 113, 1905. (New synonymy.)

Body black, with faint iridescent green reflections; areas of head around mouthparts, scape and pedicel, tegulae, legs (except procoxae), and sometimes base of gaster white or yellow; entire supraclypeal area of head may be yellow.

Female.—Length, 1.2–2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus, first funicle segment long, one-third longer than second segment, third slightly shorter than second, funicle segments densely covered with short bristles, club considerably broader than funicle segments and short, only one-fourth longer than second funicle segment; malar space one-half height of compound eye; postocellar line twice as long as ocellular. Entire surface of mesopraescutum cov-

ered with bristles, some of which are contiguous with mesal furrow (fig. 19, *e*); submarginal vein of forewing with four to six dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-sixth width of wing at hamuli. Surface of propodeum smooth, median carina only present; mesal length one-third length of mesoscutellum, propodeal spiracles almost contiguous with anterior margin, length of spiracle one-half length of lateral margin of propodeum; minute petiole usually discernible; gaster slightly longer than thorax.

Male.—Length, 1.2–1.9 mm. Scape with darkened anterior carina extending from near base to apex; first funicle segment four-fifths as long as pedicel, second and third segments equal in length and each as long as pedicel, fourth segment as long as first, club slightly longer than second and third funicle segments combined, long setae borne singly or in pairs on dorsal sides of funicle segments, these setae slightly longer than segments bearing them; gaster as long as or slighter longer than thorax.

Type locality.—Germany.

Types.—Presumably in the Forestry Academy in Eberswalde, Germany.

Hosts.—Egg capsules of domestic cockroaches, *Blatta orientalis* (Linnaeus), *Blatella germanica* (Linnaeus), *Periplaneta americana* (Linnaeus), *P. australasiae* (Fabricius), and possibly other roaches.

Distribution.—Probably worldwide; commonly collected or reared in the eastern and southern United States and the West Indies islands; also known from South and Central America, Europe, the Hawaiian Islands, and the Orient.

TETRASTICHUS CASSIDIS, new species

Dull brown, with scape, pedicel and funicle of antenna, areas bordering sutures on mesopleuron, apices of forecoxae, entire middle and hindcoxae, femora, tibiae, and tarsi light yellow; antennal club slightly darkened, and pedicel and funicle sometimes darkened toward apices.

Female.—Length, 0.8–1.0 mm. Antennae inserted at level of ventral margins of compound eyes and only slightly ventrad of center of frons; apex of scape reaching level of vertex; pedicel slightly shorter than first funicle segment; all funicle segments equal in length, club as long as two funicle segments combined; postocellar line as long as ocellular line. Mesopraescutum wider than long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with two or three dorsal bristles. Surface of propodeum covered with minute reticulations, paraspiracular carinae vague or absent; mesal length of propodeum one-third as great as length of mesoscutellum; propodeal spiracles contiguous with anterior margin; gaster ovoid, slightly shorter than thorax, venter with conspicuously long bristles.

Male.—Length, 0.9 mm. Funicle segments bearing conspicuously long setae on dorsal enlargements near bases; pedicel one-sixth longer than first funicle segment, second one-third longer than first, third and fourth each as long as second, club as long as last two funicle segments combined; length of postocellar line greater than length of ocellular line; gaster shorter than thorax.

Type locality.—Baton Rouge, La.

Types.—U.S.N.M. No. 56247.

Described from 9 female and 2 male specimens as follows: Female holotype and two female paratypes, reared from larva of *Chirida signifera* (Herbst), August 24, 1921, Guy Fletcher; male allotype and one male and six female paratypes, reared from larva of the golden tortoise beetle, *Metriona bicolor* (Fabricius), July 1921, C. E. Smith.

TETRASTICHUS SEMIAURATICEPS (Girault), new combination

Epitetrastichus semiauraticeps GIRAULT, Proc. U. S. Nat. Mus., vol. 51, p. 127, 1916.

Black with a strong, iridescent blue cast; supraclypeal area of head, anterior margin of antennal scape, apex of pedicel, tegulae, inner triangular part of scapulae, apices of coxae, trochanters, bases and apices of femora, tibiae, and basal segments of tarsi yellow or white; almost entire head may be yellow.

Female.—Length, 2.3 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus, first and second funicle segments equal in length, third segment slightly shorter than second, club as long as first two funicle segments combined; length of malar space three-fifths as great as height of compound eye; ocellular line almost as long as postocellar. Pronotum with femoral grooves as in figure 17, *e*; mesopraescutum as long as wide and bearing one row of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles, stigmal vein one-fifth length of marginal; hindwing blunt at apex, fringe at posterior margin one-fifth width of wing at hamuli. Surface of propodeum faintly reticulated, almost smooth, median carina only present; mesal length of propodeum one-fifth length of mesoscutellum; propodeal spiracles contiguous with anterior margin, minute petiole partly differentiated; gaster one and one-half to one and two-thirds times as long as thorax.

Male.—Unknown.

Type locality.—Denver, Colo.

Type.—U.S.N.M. No. 19643.

Hosts.—Reared from bud gall on *Pinus scopulorum* and needle gall on *Pinus ponderosa*; hosts probably one or more species of midges.

Distribution.—Arizona, Colorado, Maine.

TETRASTICHUS LONGICORPUS (Girault), new combinationFIGURES 16, *a*; 17, *e*

Neotetrastichodes longicarpus GIRAULT, Proc. U. S. Nat. Mus., vol. 51, p. 129, 1916.

Yellow with variable, somewhat iridescent dark spots; all of head but posterior side, dorsolateral areas of pronotum, prepectus, lateral and inner triangular parts of scapulae, lateral and posterior areas of mesopraescutum, all of mesoscutellum but spot at anterior margin on meson and areas bordering sutures and grooves, area around mesopleural suture, median lobe of metanotum, anterior coxae, and apices of middle and hind coxae, more distal segments of all legs, and base of gaster yellow; male mostly shining black.

Female.—Length, 3.0–3.5 mm. Antennae inserted nearly in center of frons, dorsad of level of ventral margins of compound eyes as in figure 16, *a*; apex of scape reaching level of anterior ocellus, first funicle segment one-fifth longer than second, second and third almost equal in length, club twice as long as second funicle segment; length of malar space two-thirds as great as height of compound eye; postocellar and ocellocular lines equal in length. Pronotum with a femoral groove (fig. 17, *e*); mesopraescutum as long as wide and bearing one row of bristles at each lateral margin; submarginal vein of forewing with five to seven dorsal bristles, marginal vein four times as long as stigmal; hindwing blunt at apex, fringe at posterior margin one-fifth width of wing at hamuli; scutellum usually bearing three pairs of bristles. Propodeum faintly reticulated, almost smooth, median carina only present; mesal length of propodeum one-fifth length of mesoscutellum; spiracles contiguous with anterior margin; rudimentary petiole present; gaster more than twice as long as thorax.

Male.—Length, 2.25 mm. Scape greatly enlarged, without a darkened anterior carina; first funicle segment slightly shorter than second, three distal segments subequal in length, funicle segments enlarged near bases and bearing conspicuously long setae; length of malar space two-thirds height of compound eye; mesal length of propodeum one-third as great as length of mesoscutellum; gaster and thorax equal in length.

Type locality.—Las Vegas, N. Mex.

Types.—U.S.N.M. No. 19645.

Host.—The western pine tip moth, *Rhyacionia frustrana bushnellii* (Busck), on *Pinus ponderosa*.

Distribution.—New Mexico.

TETRASTICHUS OKLAHOMA (Girault), new combination

Neomphaloidella oklahoma GIRAULT, Descriptiones stellarum novarum, p. 9, 1917.

Black; area of head around ocelli, bases of coxae, and gaster very dark brown; area of head around mouthparts, tegulae, inner trian-

gular part of scapulae, mesal lobe of metanotum, apices of coxae, trochanters, bases and apices of femora, tibiae, and basal segments of middle and hind tarsi white or light yellow.

Female.—Length, 2.5–3.0 mm. Antennae inserted considerably dorsad of level of ventral margins of compound eyes, as in figure 16, *a*; apex of scape slightly exceeding level of vertex, funicle segments slender, elongate, first segment one and one-fifth times as long as second, club one and one-fifth times as long as second segment; length of malar space five-eighths height of compound eye; postocellar and ocellocular lines equal in length. Mesopraescutum one-third wider than long and bearing one and a partial second row of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles; stigmal vein one-fourth as long as marginal vein; hindwing blunt at apex, fringe at posterior margin one-fifth width of wing at hamuli. Surface of propodeum faintly reticulated, median carina only present; mesal length of propodeum almost one-half as great as length of mesoscutellum; propodeal spiracles contiguous with anterior margin; gaster elongate, one and two-fifths times as long as thorax.

Male.—Length, 1.7 mm. Scape bearing a small darkened anterior carina near apex; all funicle segments equal in length and each one and two-fifths times as long as pedicel, funicle segments enlarged near bases and bearing conspicuously long bristles, club one-half as long as funicle; gaster as long as thorax.

Type locality.—Tulsa, Okla.

Type.—U.S.N.M. No. 20244.

Host.—Associated with joint worm, *Harmolita* sp., in grass stems; actual host unknown.

Distribution.—Oklahoma, Utah.

TETRASTICHUS ARGYRUS, new species

Body black, clothed with long, silver-colored bristles; frons, antennae, most of femora and tibiae, front tarsi and apical segment of middle and hind tarsi, and small areas at base and apex of gaster dark brown; darkened parts of tibiae lighter brown than those of femora; bases and apices of femora and tibiae and basal three segments of middle and hind tarsi light yellow or white.

Female.—Length, 2.0 mm. Entire body elongate, slender. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; funicle segments elongate, club short, first and second funicle segments equal in length and each almost one and one-half times as long as pedicel, third segment slightly shorter than second, club only one and one-

third times as long as first funicle segment; postocellar line twice as long as ocellocular, area of interocellar triangle with several short, irregular, transverse rugae. Mesopraescutum with long bristles distributed over its entire surface in a rather haphazard manner; submarginal vein of forewing with five dorsal bristles, marginal vein three times as long as stigmal; mesoscutellum with five pairs of bristles on either side; apex of hindwing blunt, fringe as posterior margin one-third as wide as wing at hamuli. Surface of propodeum almost smooth, paraspircular carinae absent; mesoscutellum five times as long as propodeum at meson; gaster long, slender, more than twice as long as thorax, and clothed with long bristles laterally and ventrally.

Male.—Length, 1.5 mm. Scape with small darkened anterior carina near apex; pedicel narrow, but as long as first funicle segment, second segment one and one-half times as long as first, three distal segments each of the same length, fourth segment one-half as long as club; funicle segments bearing conspicuously long bristles on enlargements near bases; submarginal vein with four dorsal bristles; mesoscutellum only two and one-half times as long as propodeum at meson; gaster sparsely clothed with bristles and only slightly longer than thorax.

Type locality.—Ames, Iowa.

Types.—U.S.N.M. No. 56248.

Described from the female holotype, male allotype, and 1 female paratype, collected at Ames, Iowa, August 28, 1927. An additional single female specimen, not included in the type series, was collected at Arlington, Va. This last-mentioned specimen is in very poor condition.

TETRASTICHUS PHEGUS, new species

Iridescent green or blue-green, with a distinct purplish cast, especially on pronotum, scapulae, pleurae, and sternae; antennal scape, ventral side of pedicel, bases and apices of femora, usually most of tibiae, and basal three segments of middle and hind tarsi light yellow or white; antennal flagellum, area of head around mouthparts, variable, poorly defined areas near bases of tibiae, front tarsi, and apical segment of middle and hind tarsi tan or light brown.

Female.—Length, 1.9–2.1 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape reaching level of margin of anterior ocellus; pedicel and first and third funicle segments each of the same length, second funicle segment slightly longer, club twice as long as third funicle segment; length of malar space two-thirds as great as height of compound eye; postocellar line twice as long as ocellocular; area of frons laterad and dorsad of scrobe cavity with numerous short, erect bristles. Mesopraescutum with two or three rather irregular rows of bristles at

each lateral margin; submarginal vein of forewing with four or five dorsal bristles, marginal vein twice as long as stigmal; mesoscutellum with four bristles on either side, these bristles usually arranged in a straight row and evenly spaced, but sometimes rather irregular; apex of hindwing blunt, fringe at posterior margin one-sixth to one-seventh as wide as wing at hamuli. Surface of propodeum shagreened anteriorly, more smooth posteriorly, median, paraspircular, and oblique carinae present, as in figure 21, *d*; spiracles almost contiguous with anterior margin of propodeum; length of mesoscutellum three and one-half times as great as median length of propodeum; gaster one and one-third times as long as thorax.

Male.—Length, 1.5 mm. Darkened anterior carina of scape three-fourths as long as scape; pedicel and each segment of funicle equal in length, club twice as long as fourth funicle segment; funicle segments semiquadrate, and without long bristles; gaster as long as thorax.

Type locality.—Victoria, Tex.

Types.—U.S.N.M. No. 56249.

Described from 25 female and 2 male specimens, as follows: Female holotype, male allotype, and 1 male and 10 female paratypes from the type locality, reared from *Disholcaspis cinerosa* (Bassett) gall on live oak (*Quercus chrysolepis*), July 1–August 6, 1909, J. D. Mitchell; 4 female paratypes, Kern County, Calif., reared from gall of *Heteroccus pacificus* Ashmead, June 30, 1893, under Bureau of Entomology No. 5542; and 10 female paratypes from Oneida, Ill., reared from gall of *Disholcaspis mamma* (Walsh), July 12, 1893, under Bureau of Entomology No. 5724⁰².

TETRASTICHUS GIGAS, new species

Iridescent green or blue-green, sometimes very dark, almost black, but always with at least a distinct, iridescent sheen, especially at meson of thoracic notum; usually base and anterior side of antennal scape, apices of femora, bases and apices of tibiae, and basal segment of middle and hind tarsi light yellow or white; darkened parts of tibiae and tarsi usually tan or brown, lighter than dark parts of femora; pronotum usually with a faint iridescent bluish or purplish cast.

Female.—Length, 3.0–4.0 mm. Antennae inserted slightly ventrad of level of ventral margin of compound eyes; apex of scape reaching level of dorsal margin of anterior ocellus; pedicel and each funicle segment equal in length, club slightly shorter than two funicle segments combined; length of malar space slightly greater than height of compound eye; postocellar line one and one-half times as long as ocellocular; area of frons dorsad and laterad of scrobe cavity set with numerous short, erect bristles, area immediately ventrad of antennal

bases with minute, closely set transverse reticulations. Mesopraescutum with two or three irregular rows of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles, marginal vein twice as long as stigmal, latter usually weak near base; mesoscutellum bearing three pairs of bristles; apex of hindwing blunt, fringe at posterior margin one-seventh to one-eighth as wide as wing at hamuli. Surface of propodeum shagreened, paraspicular carinae present; mesal length of mesoscutellum three and one-half times as great as mesal length of propodeum; spiracles separated from anterior margin of propodeum by a space one-half as great as length of a spiracle; gaster narrow, elongate, twice as long as thorax.

Male.—Length, 2.0–3.0 mm. Darkened anterior carina of scape one-half as long as scape; pedicel slightly longer than first funicle segment, first and second segments equal in length, third and fourth equal in length and each slightly longer than second; club two and one-half times as long as fourth funicle segment; segments of antennal flagellum without long bristles; gaster one and one-half times as long as thorax.

Type locality.—Stanford University, Palo Alto, Calif.

Types.—U.S.N.M. No. 56250.

Described from 47 female and 39 male specimens. Holotype female, allotype male, and 8 female and 1 male paratypes from the type locality, reared from gall of *Andricus californicus* Bassett, February 19, 1932, F. H. Sumner; 1 female paratype and 1 male paratype, Oregon Mountain, Josephine County, Oreg., reared from gall of *Andricus californicus*, November 17, 1927, H. A. Scullen; and the following paratypes, all reared from *Andricus californicus* by S. M. Dohanian, April 6–7, 1939: 4 females, 4 males, Sacramento, Calif.; 4 females, 4 males, Washington County, Oreg.; 4 females, 4 males, Benton County, Oreg.; 8 females, 8 males, Marion County, Oreg.; 8 females, 8 males, Eugene and vicinity, Oreg.; 4 females, 4 males, Polk County, Oreg.; and 4 females, 4 males, Clark County, Wash.

TETRASTICHUS HOLBEINI Girault

Tetrastichus holbeini GIRAULT, New chalcid flies, p. 2, 1917.

Very dark brown or black with green or blue-green iridescence; antennae, apices of femora, tibiae, and basal segments of tarsi light yellow or white.

Female.—Length, 2.0 mm. Antennae inserted ventrad of level of ventral margins of compound eyes; apex of scape not quite reaching level of anterior ocellus; pedicel and first funicle segment equal in length, second and third segments equal in length and each four-fifths as long as first; club as long as first and second funicle segments; length of malar space four-fifths as great as height of compound eye. Mesopraescutum as long as wide and bearing one or two rows of bristles at

each lateral margin; submarginal vein of forewing with five or six dorsal bristles; marginal vein three and one-half times as long as stigmal vein; prepectus reticulated, rest of mesopleuron almost smooth; apex of hindwing blunt, width of fringe at posterior margin one-fifth as great as width of wing at hamuli. Surface of propodeum very faintly reticulated, almost smooth; median carina almost entirely obliterated, paraspiracular carinae wanting; mesal length of propodeum one-fifth as long as mesoscutellum; propodeal spiracles separated from anterior margin by a space almost as great as length of a spiracle; gaster twice as long as thorax.

Male.—Length, 1.4 mm. Darkened anterior carina of scape one-half as long as scape; all four funicle segments equal in length and each three-fourths as long as pedicel; segments of funicle approximately quadrate and bearing relatively short setae; gaster one-third longer than thorax.

Type locality.—Yreka, Calif.

Types.—U.S.N.M. No. 21064.

Hosts.—The Pacific flathead borer, *Chrysobothris mali* Horn, in *Platanus racemosus*; the flat-headed apple tree borer, *Chrysobothris femorata* Olivier; *Chrysobothris* spp. in various trees.

Distribution.—California, Missouri, West Virginia.

TETRASTICHUS MODESTUS Howard

Tetrastichus modestus HOWARD, in Scudder, Butterflies of Eastern United States, p. 1894, 1889.—VIERECK, Connecticut State Geol. and Nat. Hist. Surv. Bull. 22, p. 453, 1916.

Epitetrastichus mundicornis GIRAULT, Chalcidoidea nova Marilandensis, pt. 3, p. 1, 1917. (New synonymy.)

Dark brown or black; apices of femora and tibiae, and three proximal segments of tarsi white; antennae may be partly or entirely yellowish.

Female.—Length, 0.8–1.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching a point considerably below level of anterior ocellus, pedicel one and three-quarters times as long as first funicle segment, second and third segments equal and each slightly longer than first, club as long as funicle; malar space two-thirds height of compound eye; postocellar line two and one-half times as long as ocellular. Mesothoracic spiracles oval, only partly concealed by projecting angle of pronotum; mesopraescutum slightly wider than long, surface entirely covered by long bristles; submarginal vein of forewing with two or three dorsal bristles; marginal vein three times as long as stigmal; hindwing blunt at apex, marginal fringe one-third width of wing at hamuli; anterior pair of scutellar bristles conspicuously long and located

near anterior margin of segment. Surface of propodeum smooth, median carina only present; mesal length of propodeum one-third length of mesoscutellum; propodeal spiracle round, minute, separated from anterior margin by a space equal to diameter of a spiracle; gaster equal in length to thorax.

Male.—Length, 0.8 mm. Scape broadened from base to apex and bearing a long, darkened anterior carina; funicle segments semi-quadrated and without long bristles, club two and one-half times as long as fourth funicle segment.

Type locality.—Coalburg, W. Va.

Types.—U.S.N.M. No. 2677. (Specimens in poor condition.)

Hosts.—*Apanteles atalantae* (Packard) parasitic on the red admiral butterfly, *Vanessa atalanta* (Linnaeus), and *Apanteles* sp. parasitic on the semicolon butterfly, *Polygonia interrogationis* (Fabricius); *Apanteles* sp. parasitic on the grape leaf folder, *Desmia funeralis* Huebner.

Distribution.—Iowa, Maryland, Ohio, Virginia, West Virginia.

TETRASTICHUS PATTERSONAE Fullaway

FIGURE 16, *c*

Tetrastichus pattersonae FULLAWAY, Journ. New York Ent. Soc., vol. 20, p. 280, 1912.

Bright, iridescent green or blue-green; antennae, trochanters, apices of femora, tibiae, and basal segments of tarsi light yellow or white.

Female.—Length, 1.9–2.2 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus; funicle segments globular, second and third segments equal and each slightly shorter than first, all funicle segments equal in width; club as long as first and second funicle segments combined; length of malar space two-thirds height of compound eye; malar furrow forming a triangle with ocular suture just ventrad of compound eye (fig. 16, *c*), ocellocular line two-thirds as long as postocellar. Mesopraescutum wider than long, entire surface densely covered by bristles, as in figure 19, *e*; submarginal vein of forewing with five or six dorsal bristles; surface of entire mesopleuron reticulated; apex of hindwing blunt, fringe at posterior margin one-ninth width of wing at hamuli; longitudinal grooves of mesoscutellum sometimes vague. Surface of propodeum lightly shagreened, paraspiracular carinae absent, mesal length of propodeum one-third length of mesoscutellum, propodeal spiracles almost touching anterior margin, one pair of submesal bristles usually present at posterior margin of propodeum; gaster one-fourth longer than thorax.

Male.—Length, 1.8–2.0 mm. First funicle segment three-fifths as long as pedicel, second to fourth funicle segments equal in length and

each as long as pedicel, funicle segments elongate, enlarged near bases, and with bristles slightly longer than the segments, club slightly longer than scape; gaster equal in length to thorax.

Type locality.—California.

Types.—The types cannot now be found and are probably lost; they were originally supposed to be in the collection at Stanford University and were labeled L. S. J. U., Lot 508, s. 19.

Hosts.—*Diplolepis echina* (Osten Sacken); *Callirhytis pomiformis* (Bassett); (?) *Disholcaspis chrysolepidis* (Bentenmüller).

Distribution.—California, Florida, Utah.

TETRASTICHUS SPILOPTERIS, new species

FIGURE 16, b

Bright, iridescent green, occasionally becoming dark purple or almost black; antennae, all of coxae except bases, trochanters, most or all of femora, tibiae, and basal segments of tarsi white or light yellow; male with a conspicuous patch of dark setae in forewing near apex.

Female.—Length, 1.0–2.2 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eye; apex of scape not quite reaching level of anterior ocellus; first funicle segment two-thirds as long as pedicel, second segment four-fifths as long as first, third three-fourths as long as second, club short, globose, twice as long as second funicle segment; length of malar space one-half height of compound eye; malar furrow straight; length of postocellar line twice as great as ocellocular. Mesopraescutum slightly wider than long and its entire surface densely covered with bristles, as in figure 19, *e*; submarginal vein of forewing with two or three dorsal bristles; marginal vein three and one-half times as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-sixth as wide as wing at hamuli. Surface of propodeum faintly reticulated, almost smooth, paraspiracular carinae wanting, mesal length of propodeum one-third length of mesoscutellum, propodeal spiracles contiguous with anterior margin; gaster one and one-half times as long as thorax.

Male.—Length, 1.1–1.5 mm. Scape twice as long as pedicel, first funicle segment four-fifths as long as pedicel, second segment equal to first, third three-fourths as long as second, fourth one-sixth shorter than third, funicle segments without conspicuously long bristles, club three times as long as fourth funicle segment; gaster as long as thorax.

Type locality.—Berkeley, Calif.

Types.—U.S.N.M. No. 56251.

Described from 11 female and 15 male specimens, as follows: From the above locality, holotype, female, and allotype, male, September

18, 1921, reared from gall of *Neuroterus saltatorius* (Riley), C. T. Dodds; 1 female paratype reared from gall of *Andricus kingi* Bassett, C. T. Dodds; and 1 male paratype collected May 26, 1907; also, 6 female and 7 male paratypes from Los Altos, Calif., May 18, 1922, E. O. Essig; 1 female and 3 male paratypes, Beaverton, Oreg., June 1, 1934, reared from an undetermined gall on *Quercus garryana*, under Hopkins U. S. No. 20559a; 2 female and 2 male paratypes, Los Angeles, Calif., reared from gall of *Callirhytis bicornis* McCracken and Egbert, April 1940, R. H. Smith; and an additional single male paratype was collected at Mesilla, N. Mex., May 31, 1938, by Christenson and Clancy, and bears the number C-9504.

TETRASTICHUS VERRUCARII Balduf

FIGURE 19, *e*

Tetrastichus verrucarii BALDUF, Can. Ent., vol. 61, pp. 125, 221, 1929.

Dull, dark brown, occasionally with very faint iridescent reflections; antennae sometimes, apices of femora, tibiae, and basal segments of tarsi white; abdomen of male may be white at base.

Female.—Length, 1.3–1.6 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not quite reaching anterior ocellus, first funicle segment one-sixth longer than second, second and third segments equal in length, club two and one-half times as long as first funicle segment; malar space one-half height of compound eye; malar furrow straight; postocellar line twice as long as ocellocular. Mesothoracic spiracle only partly covered by minute emarginate flange; mesopraescutum slightly wider than long and surface completely covered with bristles (fig. 19, *e*); submarginal vein of forewing with three to five dorsal bristles, marginal vein three and one-half to four times as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-fifth width of wing at hamuli. Propodeum very faintly reticulated, almost smooth, median carina only present; mesal length of propodeum one-fourth length of mesoscutellum; propodeal spiracles contiguous with anterior margin; gaster equal to or only slightly longer than thorax.

Male.—Length, 1.0–1.4 mm. Antennal scape with darkened anterior carina two-thirds as long as scape; pedicel and first funicle segment equal in length, second, third, and fourth equal and each one-quarter longer than first, setae slightly longer than segments borne on dorsal elevations near bases of segments, club as long as pedicel and first two funicle segments; postocellar line three times as long as ocellocular. Gaster as long as thorax.

Type locality.—Urbana, Ill.

Types.—U.S.N.M. No. 40986.

Hosts.—Oak-leaf galls, *Neuroterus verrucarum* (Osten Sacken), *N. niger* Gillette, *N. varians* Kinsey, *N. floccosus* (Bassett).

Distribution.—California, District of Columbia, Illinois, New York, Virginia.

TETRASTICHUS CARPATUS, new species

Varying from very dark brown with iridescent bluish cast to black with iridescent blue-green luster; antennal flagellum, apices of femora, bases and apices of tibiae, and basal segments of tarsi yellow or white; apex of antennal pedicel lighter in color than base; males usually considerably lighter than females.

Female.—Length, 1.1–1.6 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; scape short, its apex not reaching level of ventral margin of anterior ocellus; pedicel conspicuously enlarged at apex; first funicle segment one-sixth shorter than pedicel, second and third segments wider than first and each shorter than first, club as long as pedicel and first funicle segment; length of malar space three-fourths height of compound eye, malar furrow gently curved, almost straight; length of postocellar line four times as great as ocellular. Mesopraescutum slightly wider than long and bearing three sometimes irregular rows of bristles at each lateral margin, each row usually consisting of but three to five bristles, and sometimes only two bristles present in a row; submarginal vein of forewing with two dorsal bristles; apex of hindwing blunt, fringe at posterior margin slightly less than one-fourth as wide as wing at hamuli. Propodeum lightly shagreened, vague paraspicular carinae present; propodeal spiracles round, mesal length of propodeum one-third dorsal length of mesoscutellum; gaster elongate, acuminate, from one and two-thirds to two times as long as thorax.

Male.—Length, 0.8–1.3 mm. Scape broadened from near base to apex, pedicel globose, one-fifth longer than first funicle segment, all funicle segments beadlike, approximately equal in length, with first segment slightly narrower than fourth, conspicuously long setae absent, club one-sixth shorter than three funicle segments; gaster slightly longer than thorax.

Type locality.—Monrovia, Calif.

Types.—U.S.N.M. No. 56252.

Described from 105 female and 9 male specimens. Female holotype, male allotype, and 66 female and 4 male paratypes, from the type locality, reared from *Apanteles carpatus* (Say), Wm. Moore; 13 female paratypes, Columbus, Ohio, reared from clothes moths in 1934, H. C. Mason; 4 female paratypes, Columbus, Ohio, reared from *Tineola biselliella* Hummel, November 24, 1931, H. C. Mason; 6 female and 3 male paratypes, Silver Spring, Md., August 1931, from *Tinea pellionella* Linnaeus. W. Colman; 1 male and 9 female para-

types, Silver Spring, Md., April 6, 1933, reared from clothes moths, W. S. Abbott; and 6 female paratypes, St. Louis, Mo., reared from *Tinea fuscipunctella* Haworth, P. Rau.

Remarks.—This species is most likely always a parasite of *Apanteles carpatus* (Say), and thus a secondary parasite of clothes moths, although sometimes it has been said to have come from clothes moths themselves. *Tinea fuscipunctella* Haworth, from which some specimens were said to have been reared, is not a clothes moth but ordinarily develops in bird nests. Occasionally *T. fuscipunctella* is, however, a pest in carpets and other articles of wool in houses and thus is undoubtedly subject to attack by the same parasites as are the true clothes moths. The male of this parasite evidently is quite rare.

TETRASTICHUS HUNTERI Crawford

FIGURE 19, d

Tetrastichus hunteri CRAWFORD, Proc. Ent. Soc. Washington, vol. 11, p. 150, 1909.—PIERCE, U. S. Bur. Ent. Bull. 100, p. 52, 1912.—HUNTER and PIERCE, U. S. Bur. Ent. Bull. 114, p. 142, 1912.

Iridescent blue-green, sometimes with a slight purple tinge; antennal flagellum, coxae, all but apices and bases of femora and tibiae, front tarsi and apical segments of middle and hind tarsi brown or black; scape, apices and bases of femora and tibiae and basal segments of middle and hind tarsi yellow; abdomen brown or tan at base.

Female.—Length, 1.8–2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not quite reaching level of anterior ocellus, first funicle segment as long as pedicel, second slightly longer than first, third as long as first, club as long as two apical funicle segments; length of malar space two-thirds height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum slightly wider than long and bearing three rows of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles; marginal vein three times as long as stigmal, mesoscutellum usually with six bristles; apex of hindwing blunt, fringe at posterior margin one-fifth width of wing at hamuli. Propodeum shagreened and both median and paraspiracular carinae present; mesal length of propodeum one-fourth length of mesoscutellum; propodeal spiracles separated from anterior margin by a space equal to diameter of a spiracle; gaster slightly longer than thorax.

Male.—Unknown.

Type locality.—Natchez, Miss.

Types.—U.S.N.M. No. 12677.

Host.—Larvae of the cotton boll weevil, *Anthonomus grandis* Boheman.

Distribution.—Louisiana, Mississippi, Texas. (Probably occurs wherever cotton is grown.)

TETRASTICHUS TURIONUM (Hartig)

Eulophus turionum HARTIG, Jahresb. Fortschr. Forstw., vol. 1, p. 268, 1838.—

RATZBURG, Die Ichneumoniden der Forstinsecten . . . , vol. 1, p. 168, 1844.

Entedon turionum (Hartig) RATZBURG, Die Ichneumoniden der Forstinsecten . . . , vol. 2, p. 170, 1848; vol. 3, p. 214, 1852.

Tetrastichus turionum (Hartig) DOWDEN, Ann. Ent. Soc. Amer., vol. 27, p. 602,

1934.—BERGOLD and RIPPER, Zeitschr. für Parasitenk., vol. 9, p. 415, 1937.—

DOWDEN and BERRY, Journ. Econ. Ent., vol. 31, p. 459, 1938.

Iridescent blue-green; antennae brown; trochanters, apices of femora, usually tibiae, and tarsi light yellow or white.

Female.—Length, 1.1–2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus, all funicle segments equal in length and each as long as pedicel, third funicle segment slightly constricted at base, club as long as two funicle segments; malar space three-fifths height of compound eye; mesopraescutum wider than long and each lateral margin bearing three rows of bristles, mesal row on each side may be irregular; submarginal vein of forewing with three or four dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-fifth width of wing at hamuli. Surface of propodeum smooth, median carina vague; mesal length of propodeum one-fifth length of mesoscutellum; propodeal spiracles not quite touching anterior margin; gaster varying from one and three-quarters to twice as long as thorax.

Male.—Length, 1.0–1.4 mm. Scape thickened and with a long anterior carina, all funicle segments equal in length and each equal to pedicel, funicle segments slightly enlarged near bases, and bearing setae as long as the segments, club slightly longer than two apical funicle segments.

Type locality.—Germany.

Types.—Possibly in Munich, Germany.

Host.—*Rhyacionia buoliana* (Schiffermüller), the European pine shoot moth.

Distribution.—Massachusetts, New York; western and central Europe.

TETRASTICHUS CAERULESCENS Ashmead

FIGURE 19, b

Tetrastichus caerulescens ASHMEAD, Proc. Ent. Soc. Washington, vol. 4, p. 130,

1897.—VIERECK, Connecticut State Geol. and Nat. Hist. Survey Bull. 22, p.

455, 1916.—FRISON, Bull. Illinois Nat. Hist. Survey, vol. 16, p. 223, 1927.

Tetrastichus doteni CRAWFORD, Proc. Ent. Soc. Washington, vol. 13, p. 234, 1911.
(New synonymy.)

Iridescent blue-green; scape sometimes, apices of femora, bases and apices of tibiae, and basal segments of tarsi light yellow or white; darkened areas of tibiae sometimes lighter than dark parts of femora, but generally they are the same color; mesal lobe of metanotum slightly lighter than dorsum of thorax.

Female.—Length, 1.6–1.8 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; pedicel and first funicle segment equal in length, second and third segments equal and each slightly shorter than first, club as long as pedicel and first funicle segment; length of malar space one-half as great as height of compound eye; postocellar line three times as long as ocellocular. Mesopraescutum as long as wide and bearing three or four rows of bristles at each lateral margin, meson always bare (fig. 19, *b*); submarginal vein of forewing with four or five dorsal bristles; stigmal vein long, slightly more than one-half as long as marginal; hindwing blunt at apex, fringe at posterior margin one-fourth as wide as wing at hamuli. Surface of propodeum very faintly reticulated, almost smooth, paraspircular carinae wanting, mesal length of propodeum one-fifth as great as length of mesoscutellum; spiracles almost contiguous with anterior margin of propodeum; gaster one and one-half times as long as thorax.

Male.—Length 1.5 mm. Darkened anterior carina of scape one-half as long as scape; funicle segments semiquadrate and bearing setae only as long as the segments; first segment three-fourths as long as second; gaster and thorax equal in length; apex of ninth tergite acute, rather than blunt.

Type locality.—Urbana, Ill.

Types.—Holotype and allotype in Illinois Natural History Survey collection.

Hosts.—*Microbracon gelechiae* (Ashmead), parasitic on *Canarsia hammondi* Riley; *Microbracon* sp. and *Apanteles* sp. parasitic on various Coleoptera and Lepidoptera. Specimens have been reared, apparently as primary parasites, from *Coleophora malivorella* Riley and an unidentified lepidopterous miner on arborvitae (probably *Argyresthia thujiella* (Packard) or *Recurvaria thujaella* Kearfott). A series was also reared from the cocoons of a coniopterygid, *Malacomyza* (*Aleuronia*) *westwoodi* (Fitch); another series was reared from the heads of bush clover (*Lespedeza*) infested with *Apion* sp. (probably *A. decoloratum* Smith) and an unidentified bruchid. The specimens of *T. caerulescens* in this case, however, probably emerged from the cocoons of some *Microgaster* parasitic on the weevils. The same may

be true of a series said to have been reared from *Tychius lineellus* LeConte in the seed heads of *Lupinus*.

Distribution.—Arkansas, California, Colorado, Delaware, District of Columbia, Georgia, Illinois, Kansas, Maine, Maryland, Nevada, New Brunswick, Pennsylvania, Texas, Virginia, West Virginia.

TETRASTICHUS DOLOSUS Gahan

Tetrastichus dolosus GAHAN, Proc. U. S. Nat. Mus., vol. 53, p. 215, 1917.

Very dark, iridescent blue-green; head, antennae, coxae, and basal parts of femora brown; tibiae and tarsi light yellow or white.

Female.—Length, 1.25–1.35 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching anterior ocellus; all funicle segments equal in length and each as long as pedicel, and as wide as long, club as long as scape; length of malar space one-half as great as height of compound eye; postocellar line three times as long as ocellular. Mesopraescutum as wide as long, surface almost entirely covered with bristles, bare only on meson, so that there are four or five rows of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles; marginal vein twice as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-quarter width of wing at hamuli. Surface of propodeum almost smooth, slightly roughened; paraspircular carinae absent; mesal length of propodeum one-third length of mesoscutellum; propodeal spiracles separated from anterior margin by a space equal to diameter of a spiracle; gaster as long as thorax.

Male.—Length, 1.1 mm. Scape broadened, its darkened anterior carina three-eighths as long as scape, pedicel and all funicle segments equal in length, funicle segments nearly quadrate and without long setae, club as long as three funicle segments.

Type locality.—Tallulah, La.

Types.—U.S.N.M. No. 20395.

Hosts.—*Euplectrus comstockii* Howard parasitic on *Caradrina* sp.; *Euplectrus* sp. parasitic on larvae of the spring cankerworm, *Paleacrita vernata* (Peck); *Euplectrus plathypenae* Howard parasitic on larvae of the green clover worm, *Plathypena scabra* (Fabricius) and other Lepidoptera. Specimens were also reared, possibly as primary parasites, from the strawberry leaf roller, *Ancyliis comptana* (Froelich), and *Fascista cercerisella* (Chambers).

Distribution.—Kansas, Louisiana.

TETRASTICHUS STROBILUS, new species

Head and thorax black, with strong iridescent bluish luster; antennal flagellum, area of head around mouthparts, metanotum, small area at

base of gaster, darkened area on femora, entire front tarsi, and apical segment of middle and hind tarsi brown; usually entire scape, pedicel and ventral side of first funicle segment of antenna, inner triangular part of scapulae, bases and apices of femora, usually entire tibiae, and basal three segments of middle and hind tarsi light yellow or white. Inner side of tibiae, dorsal line on scape, and basal area of pedicel may be somewhat darkened.

Female.—Length, 1.5–2.2 mm. Area of frons dorsad and laterad of scrobe cavity deeply punctured; area immediately ventrad of antennal bases shagreened; fracture at ventral margin of compound eye obscure, small; antennae inserted slightly dorsad of level of ventral margins of compound eyes, apex of scape reaching level of ventral margin of anterior ocellus; pedicel and first funicle segment equal in length, second segment slightly shorter than first and third slightly shorter than second, club one and one-half times as long as first funicle segment, length of malar space one-half as great as height of compound eye; postocellar line one and one-half times as long as ocellular line. Mesopraescutum bearing one row of bristles at each lateral margin; submarginal vein of forewing bearing three or four dorsal bristles, submarginal vein three and one-half times as long as stigmal vein; posterior scutellar bristles located slightly nearer lateral margin of sclerite than are anterior scutellars; apex of hindwing blunt, fringe at posterior margin one-fifth as great as width of wing at hamuli. Surface of propodeum very faintly reticulated, almost smooth, paraspiracular carinae wanting, postspiracular carinae obscure; spiracles contiguous with anterior margin of propodeum; gaster one and two-thirds to almost twice as long as thorax.

Male.—Length, 1.5–1.9 mm. Scape with short darkened anterior carina near apex; pedicel globose, slightly longer than first funicle segment. Second segment one and two-thirds times as long as first, third and fourth equal in length and each one and one-fourth times as long as second, club slightly longer than two apical funicle segments combined; funicle segments bearing conspicuously long bristles on enlargements near bases of segments; marginal vein three times as long as stigmal; gaster as long as or slightly longer than thorax.

Type locality.—Jenny Creek, Oreg.

Types.—U.S.N.M. No. 56253.

Described from the female holotype, male allotype, and 8 female and 7 male paratypes reared from an unidentified lepidopteron in the cones of Douglas fir, *Pseudotsuga taxifolia*, during 1938–1939, by J. E. Patterson, under Hopkins U. S. No. 32333-C.

Host.—The host of this species probably is *Barbara colfaxiana* (Kearfott).

TETRASTICHUS SOBRIUS Gahan

Tetrastichus sobrius GAHAN, Ann. Ent. Soc. Amer., vol. 12, p. 166, 1919.

Body brown or black; antennae, apices of femora, tibiae and basal segments of tarsi light yellow or white; abdomen of male white at base.

Female.—Length, 1.5–2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of antennal scape reaching level of ventral margin of anterior ocellus; first funicle segment slightly longer than pedicel, second equal to pedicel in length, third slightly shorter, each segment slightly wider than the one proximad of it, club as long as second and third funicle segments combined; ocellocular line one-half as long as postocellar. Mesopraesutum as wide as long and bearing two rows of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles, marginal vein six times as long as stigmal; both pairs of scutellar bristles located posterior to middle of segment. Apex of hindwing blunt, fringe at posterior margin one-fifth width of wing at hamuli. Surface of propodeum slightly roughened, both median and paraspicular carinae present; mesal length of propodeum one-sixth length of mesoscutellum; propodeal spiracles touching anterior margin, length of spiracle equal to mesal length of propodeum; gaster long, narrow, and acutely pointed, twice as long as thorax.

Male.—Length, 1.0–1.25 mm. Scape broad and bearing a short, darkened anterior carina near apex, first funicle segment two-thirds as long as pedicel, second segment twice as long as first, third and fourth equal and each slightly longer than second, conspicuously long setae borne on transverse dorsal elevations near bases of segments; club as long as third and fourth funicle segments; gaster slightly shorter than thorax.

Type locality.—Tempe, Ariz.

Types.—U.S.N.M. No. 22300.

Hosts.—Originally said to be a parasite of the alfalfa gall midge, *Asphondylia websteri* Felt; additional material was reared from flower galls on *Senecio douglassi*, probably made by *Asphondylia bea* Felt.

Distribution.—Arizona, California; Russia.

Remarks.—Specimens of a species of *Tetrastichus* reared from alfalfa in Russia were found to be the same as this species; European authors may have referred to this species under some other name.

TETRASTICHUS PUNCTATIFRONS (Girault), new combination

FIGURES 17, c; 19, a; 21, b

Epitetrastichus punctatifrons GIRAULT, Proc. U. S. Nat. Mus. vol. 51, p. 128, 1916.

Body black or very dark brown, with metallic-green reflections; head metallic blue-green or purple; antennae, bases and apices of femora and tibiae, and basal segments of tarsi white, light yellow, or tan; color of metatibiae variable; abdomen paler brown at base; all setae borne by head and body set in conspicuous pits.

Female.—Length, 2.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of ventral margins of anterior ocellus; scape two and one-half times as long as pedicel, first funicle segment slightly shorter than pedicel, second equal to pedicel, third as long as first, club as long as second and third funicle segments combined; malar space two-thirds height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum wider than long, two rows of bristles present at each lateral margin, bristles arising from conspicuous pits (fig. 19, *a*); median groove slightly broadened posteriorly; submarginal vein of forewing with three to five dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-fourth as great as width of wing at hamuli; metacoxae deeply pitted. Surface of propodeum shagreened (fig. 21, *b*); mesal length two-fifths as great as length of mesoscutellum; both median and lateral carinae present; propodeal spiracles contiguous with anterior margin; gaster slightly longer than thorax.

Male.—Length, 1.6–1.8 mm. Scape bearing a short darkened carina near apex, first funicle segment two-thirds as long as pedicel, second almost twice as long as first, third and fourth each one-third longer than second, funicle segments elongate, enlarged near bases, and bearing conspicuously long setae, club as long as three apical funicle segments; gaster slightly longer than thorax.

Type locality.—Tempe, Ariz.

Types.—U.S.N.M. No. 19644.

Host.—Leaf miner in cottonwood (*Populus*), probably *Paraleucoptera albella* (Chambers).

Distribution.—Arizona.

TETRASTICHUS BANKSII Howard

Tetrastichus banksii HOWARD, Proc. Ent. Soc. Washington, vol. 2, p. 299, 1892.

Body brown; scape of antennae, apices of femora, tibiae, and tarsi light yellow or white.

Female.—Length, 1.9 mm. Frons strongly punctured laterad of scrobe cavity; antennae inserted at level of ventral margins of compound eyes; apex of scape not quite reaching level of anterior ocellus; first and second funicle segments equal in length; third segment slightly shorter than second, club as long as pedicel and first funicle segment; length of malar space two-thirds height of compound eye;

ocellocular line two-thirds as long as postocellar. Prepectus much more strongly reticulated than rest of mesopleuron; mesopraescutum wider than long and bearing one row of bristles at each lateral margin, these bristles set in conspicuous pits; submarginal vein of forewing with two or three dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-fourth width of wing at hamuli. Propodeum shagreened and bearing median, paraspiracular, and oblique carinae, as in figure 21, *d*; propodeal spiracles almost touching anterior margin; gaster one-fourth longer than thorax.

Male.—Unknown.

Type locality.—Washington, D. C.

Types.—U.S.N.M. No. 2688.

Host.—This species is a primary or secondary parasite of argiopid spiders, issuing from the egg sacs.

Distribution.—District of Columbia, Florida.

TETRASTICHUS GIBBONI (Girault), new combination

FIGURE 16, *g*

Ootetrastichus gibboni GIRAULT, Bull. Brooklyn Ent. Soc., vol. 12, p. 86, 1917.

Head and base of gaster white, yellow, or tan; thorax brown, with iridescent green reflections; apical part of gaster brown, legs (except bases of metacoxae and apical segments of tarsi) white.

Female.—Length, 1.3–1.6 mm. Antennae inserted slightly dorsal of level of ventral margins of compound eyes; apex of scape exceeding level of vertex, pedicel and flagellar segments slender, elongate; three ring segments discernible, first funicle segment one-third longer than pedicel, second and third equal in length and each two-thirds as long as first, club as long as second and third funicle segments combined (fig. 16, *g*); length of malar space three-fourths height of compound eye; postocellar line one and two-thirds times as long as ocellocular. Mesopraescutum slightly wider than long and bearing only two or three bristles at each lateral margin; submarginal vein of forewing with two dorsal bristles; hindwing acute at apex; fringe at posterior margin one-half width of wing at hamuli. Surface of propodeum smooth, bearing a median carina only; mesal length of propodeum one-third length of mesoscutellum; propodeal spiracles round, minute, separated from anterior margin by a space equal to diameter of a spiracle; minute petiole present, gaster twice as long as thorax.

Male.—Unknown.

Type locality.—Tempe, Ariz.

Types.—U.S.N.M. No. 20787.

Host.—Larvae of the clover stem borer, *Languria mozardi* (Latreille).

Distribution.—Arizona.

TETRASTICHUS POLYNEMAE Ashmead

FIGURE 20, *f*

Tetrastichus polynemae ASHMEAD, Ent. News, vol. 11, p. 616, 1900.

Aprostocetus polynemae (Ashmead) GIRAULT, Proc. U. S. Nat. Mus., vol. 51, p. 130, 1916 (not *Aprostocetus polynemae* Ashmead).

Ootetrastichus mymaridis GIRAULT, Proc. U. S. Nat. Mus., vol. 51, p. 130, 1916. (New synonymy.)

Bright, iridescent green; abdomen varying from brown to iridescent green; legs, except coxae, anterior tarsi, and apical segments of middle and hind tarsi white.

Female.—Length, 1.0–1.2 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; scape short, its apex not reaching level of ventral margin of anterior ocellus; first funicle segment one-third longer than pedicel, second and third segments equal and each slightly shorter than first; club as long as second and third funicle segments; length of malar space two-fifths height of compound eye; postocellar line equal in length to ocellular. Mesopraescutum as long as wide and bearing two or three bristles at each lateral margin; submarginal vein of forewing with two or three bristles; apex of hindwing acute, width of fringe at hind margin equal to width of wing at hamuli; first bristle of hamuli one-half as long as width of wing (fig. 20, *f*). Surface of propodeum slightly reticulated; inconspicuous paraspicular carinae present; propodeal spiracles minute, not quite contiguous with anterior margin; gaster one and one-half times as long as thorax.

Male.—Unknown.

Type locality.—Lake Forest, Ill.

Types.—U.S.N.M. No. 5323.

Host.—Eggs of damselfly, *Lestes* sp.

Distribution.—Delaware, Illinois.

TETRASTICHUS OECANTHIVORUS var. COMPAR Gahan

FIGURE 16, *e*

Tetrastichus oecanthivorus var. *compar* GAHAN, Ann. Ent. Soc. Amer., vol. 25, p. 743, 1932.

Thorax and apex of abdomen iridescent green; variable areas of head and antennae, tegulae, and dorsal sector of metapleuron, legs (except coxae of female), and base of gaster yellow; all tarsi light brown.

Female.—Length, 1.3–1.4 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of vertex, first funicle segment one and one-third times as long as second, second and third equal in length (fig. 16, *e*); club two and one-quarter times as long as third funicle segment; malar space one-half height of compound eye; postocellar line one-fourth longer than ocellular. Meso-

praescutum slightly wider than long and bearing two bristles at each lateral margin; submarginal vein of forewing with two or three dorsal bristles; apex of hindwing acute, fringe at posterior margin two-thirds as wide as wing at hamuli. Propodeum very faintly sculptured, almost smooth, well-defined median carina present; mesal length of propodeum one-fifth length of mesoscutellum; propodeal spiracles minute, not quite touching anterior margin; gaster narrow, elongate, twice as long as thorax.

Male.—Length, 1.2–1.3 mm. Scape enormously enlarged, and lacking a darkened anterior carina; first funicle segment as long as pedicel, three apical funicle segments equal in length and each two-thirds as long as first, funicle segments nearly quadrate and without conspicuously long bristles, club as long as three distal funicle segments combined, gaster one-third longer than thorax.

Type localities.—Mount Holly Springs and Carlisle, Pa.

Types.—U.S.N.M. No. 43916.

Host.—Eggs of tree cricket, *Oecanthus* sp.

Distribution.—Pennsylvania, South Carolina, Texas.

Remarks.—This variety is only doubtfully distinct from the European form.

TETRASTICHUS VENUSTUS Gahan

Tetrastichus venustus GAHAN, Proc. U. S. Nat. Mus., vol. 48, p. 168, 1914.—

URBAHNS, U. S. Dept. Agr. Bull. 812, p. 18, 1920.—NIKOL'SKAYA, Rev. Ent.

U. S. S. R., vol. 25, p. 119, 1933.

Female yellow with variable greenish-brown iridescent spots; most of head, dorsum of pronotum, areas outlining sutures on dorsum of thorax, tegulae, prepectus, metanotum, apices of coxae, trochanters, femora (except variable areas near bases), basal segments of tarsi, and base and variable lateral areas of gaster yellow. Male usually almost entirely iridescent brownish green.

Female.—Length, 1.3–1.8 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of vertex; first funicle segment one-fifth longer than pedicel, second and third segments combined equal in length to club; length of malar space two-thirds as great as height of compound eye; postocellar line two and one-quarter times as long as ocellular. Mesopraescutum as long as wide and bearing one row of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles, marginal vein three and one-half times as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-fifth as wide as wing at hamuli. Surface of propodeum very faintly reticulated, paraspiracular carinae absent, mesal length of propodeum one-third as great as length of mesoscutellum, propodeal spiracles contiguous with anterior margin of propodeum; gaster one and three-fourths times as long as thorax.

Male.—Length, 1.3 mm. Pedicel one and two-fifths times as long as first funicle segment, second to fourth segments equal and each twice as long as first, conspicuously long bristles borne by funicle segments on dorsal elevations near bases, club as long as three apical funicle segments combined; interocellar line three times as long as ocellocular; gaster and thorax equal in length.

Type locality.—Corcoran, Calif.

Types.—U.S.N.M. No. 18339.

Hosts.—Probably the clover and alfalfa seed chalcid, *Bruchophagus funebris* (Howard), or the alfalfa gall midge, *Asphondylia websteri* Felt.

Distribution.—California, Indiana, Iowa; Russia.

Remarks.—This species may be a synonym of the European species, *T. brevicornis* (Panzer). Nikol'skaya²⁴ held the same opinion.

TETRASTICHUS XANTHOPS (Ratzeburg)

FIGURE 16, k

Eulophus xanthops RATZEBURG, Die Ichneumonen der Forstinsecten, vol. 1, p. 170, 1844.

Entedon xanthops (Ratzeburg) RATZEBURG, Die Ichneumonen der Forstinsecten, vol. 2, p. 170, 1848; vol. 3, p. 215, 1852.

Tetrastichus xanthops (Ratzeburg) THOMSON, Hymenoptera Scandinaviae, vol. 5, p. 287, 1878.—DOWDEN, U. S. Dept. Agr. Techn. Bull. 757, p. 32, 1941.

Geniocerus xanthops (Ratzeburg) KURDJUMOV, Russ. Ent. Obozr. (Rev. Russe Ent.), vol. 13, p. 248, 1913.

Body iridescent green; variable areas of frons and antennae, tegulae, and spot at dorsal margin of mesopleuron yellow; front coxae, and apices of middle and hind coxae, and remainder of all legs white; base of gaster usually white.

Female.—Length, 1.0–1.6 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus, all three funicle segments equal in length and each slightly longer than pedicel, club two and one-half times as long as a funicle segment; malar space three-fifths height of compound eye; postocellar line twice as long as ocellocular. Mesopraescutum as wide as long and bearing two rows of bristles at each lateral margin, median groove vague; entire mesopleuron almost smooth; submarginal vein of forewing with four or five dorsal bristles; marginal vein five times as long as stigmal; apex of hindwing acute, fringe at posterior margin one-third width of wing at hamuli, mesoscutellum usually with six bristles. Surface of propodeum faintly reticulated, almost smooth, only a faint median carina present; mesal lengths of propodeum and postscutellum equal; propodeal spiracles minute, separated from anterior margin by a space equal to diameter

²⁴ Rev. Ent. U. S. S. R., vol. 25, p. 119, 1933.

of a spiracle; gaster blunted at apex and its length equal to that of thorax, apex of ovipositor forming a minute, pointed projection in otherwise blunt abdomen.

Male.—Length, 0.8 mm. First funicle segment slightly shorter than pedicel, three distal funicle segments equal in length and each twice as long as first segment, all funicle segments bearing conspicuously long bristles on dorsal elevations near bases, bristles borne by first segment as long as entire funicle; club two and one-quarter times as long as fourth funicle segment; gaster as long as thorax.

Type localities.—Sweden; Germany.

Types.—Presumably in the Forestry Academy in Eberswalde, Germany.

Hosts.—The European birch leaf miner, *Phyllotoma nemorata* (Fallen); the elm leaf miner, *Fenusa ulmi* (Sundevall); the apple flea weevil, *Orchestes pallicornis* Say; *Phanomeris phyllotomae* Muesebeck; *Chrysocharis* sp. Several other hosts mentioned in European literature.

Distribution.—Massachusetts, Ohio; northern, central, and western Europe.

Remarks.—This species should not be confused with *Tetrastichus xanthopus* (Nees), which parasitizes *Dendrolimus pini* (Linnaeus) in Europe.

TETRASTICHUS RACEMARIAE Ashmead

FIGURES 17, *f*; 21, *d*

Tetrastichus racemariae ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 134, 1886.—

CRESSON, Synopsis of families and genera of Hymenoptera of America north of Mexico, p. 245, 1887.—VIERECK, Connecticut State Geol. Nat. Hist. Survey Bull. 22, p. 453, 1916.

Tetrastichus californicus ASHMEAD, Proc. Amer. Ent. Soc., vol. 14, p. 203, 1887. (New synonymy.)

Hyperteles flocci ASHMEAD, Proc. Amer. Ent. Soc., vol. 14, p. 203, 1887. (New synonymy.)

Dark brown or black with varying degrees of metallic-green iridescence; antennae, trochanters sometimes, bases and apices of femora, tibiae usually, and basal segments of tarsi white or light yellow; color of metatibiae variable.

Female.—Length, 1.8–2.2 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; scape two and one-third times as long as pedicel, all funicle segments equal in length and each slightly longer than pedicel, club not quite twice as long as first funicle segment: malar space three-fifths height of compound eye; postocellar line two to two and one-half times as long as ocellular. Mesopraescutum wider than long and provided with two rows of bristles at each

lateral margin; submarginal vein of forewing with three or four dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-seventh width of wing at hamuli. Surface of propodeum strongly shagreened; mesal length of propodeum one-third length of meso-scutellum; median, paraspircular, and oblique carinae usually present (fig. 21, *d*), oblique carinae sometimes obscure; propodeal spiracles almost contiguous with anterior margin, their diameters equal to one-half median length of propodeum; gaster one and one-half times as long as thorax.

Male.—Length, 1.5–2.0 mm. Scape bearing darkened carina near apex, first funicle segment one-third longer than pedicel; second, third, and fourth segments equal in length and each slightly shorter than first; funicle segments subquadrate, without conspicuously long bristles, club short, only as long as pedicel and first funicle segment combined; gaster as long as thorax.

Type locality.—Jacksonville, Fla.

Types.—U.S.N.M. No. 2488. (Male type specimens missing.)

Hosts.—Oak galls, *Amphibolips cinereae* (Ashmead), *Amphibolips racemaria* (Ashmead), *Amphibolips prunus* (Walsh), *Callirhytis pomiformis* (Bassett), *Disholcaspis mamma* (Walsh), *Andricus lasius* Ashmead, *Andricus flocci* (Walsh), *Neuroterus batatus* (Fitch).

Distribution.—Apparently to be found over most of the United States.

TETRASTICHUS CORMUS, new species

FIGURES 16, *j*; 17, *g*; 21, *c, h*

Head and thorax minutely shagreened; dark iridescent blue-green; usually dorsal side of entire antenna, coxae, basal four-fifths of femora, central parts of middle and hind tibiae, apical segment of each tarsus, and gaster dull brown; ventral side of antennae, apices of femora, fore tibiae, apices and bases of middle and hind tibiae, and basal segments of tarsi light yellow; entire antennal flagellum may be yellow rather than brown dorsally.

Female.—Length, 2.0–2.5 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; pedicel and first funicle segment equal in length, second segment one-fifth longer, third equal to first; club twice as long as third segment; malar suture arcuate, length of malar space three-fourths as great as height of compound eye; length of postocellar line twice as great as ocellular. Mesopraescutum slightly wider than long and bearing two rows of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-sixth as wide as wing at hamuli; entire thoracic pleuron shagreened. Surface of propodeum shagreened, strong mesal and para-

spiracular carinae present and a series of short carinae radiating latero-anteriorad from posterior margin (fig. 21, *c*); mesal length of propodeum one-fifth greater than that of postscutellum and slightly more than one-third as great as length of mesoscutellum; propodeal spiracles, separated from anterior margin by a space one-half as great as length of a spiracle; rudimentary petiole narrow, obscure; dorsal surface of gaster very obscurely reticulated, almost smooth, longer than thorax.

Male.—Length, 1.5–1.9 mm. Antennal scape broadened only near apex, flagellar segments without conspicuously long setae, shaped as in female; pedicel and each funicle segment of the same length, club slightly more than twice as long as fourth funicle segment; gaster slightly longer than thorax and propodeum.

Type locality.—Urbana, Ill.

Types.—Holotype, allotype, 9 male and 16 female paratypes in Illinois Natural History Survey collection; 6 female and 3 male paratypes, U.S.N.M. No. 56254.

Described from 23 female and 13 male specimens: Female holotype, male allotype, and 22 female and 12 male paratypes reared from wild lettuce galls of *Aulacidea podagrae* (Bassett), January 26, 1891, C. A. Hart. An additional 20 female and 7 male specimens of this species, not included in the type series, are in the National Museum collection; these appear to have been reared from a stem gall on blueberry made by *Hemadas nubilipennis* Ashmead, March 8, 1872, but these data may not be correct; no locality record is available for these specimens.

TETRASTICHUS MINUTUS (Howard)

Astichus minutus HOWARD, in Comstock, U. S. Dept. Agr., Rep. Ent., 1881, p. 369.—

CRESSON, Synopsis of families and genera of Hymenoptera . . ., p. 245, 1887.—VIERECK, Connecticut State Geol. and Nat. Hist. Survey Bull. 22, p. 457, 1916.

Epomphaloides minutus (Howard) GIRAULT, Societas Entomologica, vol. 31, p. 35, 1916.

Tetrastichus lecanii ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, p. xix, 1885.—

CRESSON, Synopsis of families and genera of Hymenoptera . . ., p. 246, 1887. (New synonymy.)

Ceraninus lecanii (Ashmead) ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 202, 1887.

Tetrastichus blepyri ASHMEAD, Can. Ent., vol. 32, p. 304, 1902.—ARMITAGE, Journ.

Econ. Ent., vol. 16, p. 511, 1923.—GAHAN, Proc. U. S. Nat. Mus., vol. 65, art. 4, p. 19, 1924.—TIMBERLAKE and CLAUSEN, Univ. California Publ. Ent., vol. 3, p. 248, 1924.—MILLER and THOMPSON, Florida Ent., vol. 11, p. 3, 1927.—SMITH and COMPERE, Univ. California Publ. Ent., vol. 4, p. 306, 1928.—MILLER, Florida Agr. Exp. Stat. Bull. 203, p. 456, 1929. (New synonymy.)

Tetrastichus (*Tetrastichodes*) *detrimmentosus* GAHAN, Proc. U. S. Nat. Mus., vol. 46, p. 439, 1913; vol. 65, art. 4, p. 19, 1924.

Tetrastichodes detrimmentosus Gahan, GIRAULT, Societas Entomologica, vol. 31, p. 35, 1916.

Varying from dull brown to shining black, faintly iridescent; variable areas on scape and pedicel of antennae, trochanters, apices of femora, tibiae, and basal segments of tarsi yellow or white.

Female.—Length, 0.9–1.8 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching anterior ocellus, all funicle segments subequal in length and equal in width; club short, globose, wider than funicle segments and as long as two funicle segments; length of malar space two-thirds as great as height of compound eye; postocellar line twice as long as ocellocular line. Mesopraescutum longer than wide, lacking a median groove and having one row of bristles at each lateral margin, posterior pair of bristles much longer than more anterior ones, as in figure 19, *c*; submarginal vein of forewing with three to five dorsal bristles; apex of hindwing blunt. Surface of propodeum smooth or very slightly roughened anteriorly, median carina only present; spiracles almost touching anterior margin of propodeum; gaster clothed with fairly long bristles.

Male.—Length, 0.8–1.3 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; funicle segments enlarged near bases and bearing numerous, conspicuously long bristles, first segment one-half as long as second; gaster slightly shorter than thorax.

Type locality.—Washington, D. C.

Type.—U.S.N.M. No. 2619. (The type specimen, a male, is in very poor condition; only fragments of the thorax remain. A wing from this type was at one time preserved on a slide, but that slide cannot be found.)

Hosts.—*Anagyrus* spp. parasitic on the grape mealybug, *Pseudococcus maritimus* (Ehrhorn); *Aphycus lounsburyi* (Howard) parasitic on *Lecanium* spp.; the cotton and melon aphid, *Aphis gossypii* Glover; the apple aphid, *Aphis pomi* De Geer; *Aphis* spp.; *Cycloneda sanguinea* (Linnaeus) (may be incorrect); the European fruit lecanium, *Lecanium corni* Bouché; the terrapin scale, *Lecanium nigrofasciatum* Pergande; the European peach scale, *Lecanium persicae* (Fabricius); the false maple scale, *Phenacoccus acericola* (King); *Phenacoccus helianthi* Cockerell; *Physokermes insignicola* (Craw); *Pulvinaria bigeloviae* Cockerell; the black scale, *Saissetia oleae* (Bernard).

Distribution.—Occurs over most of the United States, especially in the Southeast and on the Pacific coast; specimens from South Africa can, also, be placed under this name.

Remarks.—It is possible that this species is always a hyperparasite. It is very likely that the species will eventually be shown to be very widely distributed over the world and have a lengthy synonymy.

TETRASTICHUS FAUSTUS, new species

Black, with blue-green iridescence; usually entire scape and apex of pedicel, apices of femora, tibiae, and basal segments of middle and hind tarsi yellow or white; tibiae may be slightly darkened near base; teneral specimens have broad yellow areas bordering sutures on dorsum of thorax; postscutellum always somewhat lighter in color than rest of thorax.

Female.—Length, 1.5–1.7 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of ventral margin of anterior ocellus; first funicle segment as long as pedicel and one and one-fifth times as long as second; third slightly shorter than second and both wider than first, club as long as second and third funicle segments combined; length of malar space two-thirds height of compound eye, malar suture curved just dorsad of base of mandible; length of ocellocular line two-thirds as great as postocellar. Mesopraescutum wider than long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles; apex of hindwing blunt; entire dorsum of thorax closely and evenly reticulated. Surface of propodeum faintly reticulated, almost smooth, mesal length of propodeum equal to that of metanotum and one-third as great as dorsal length of mesoscutellum; median carina only present; spiracles contiguous with anterior margin of propodeum; gaster elongate, acuminate, one-third longer than thorax.

Male.—Unknown.

Type locality.—East shore, Flathead Lake, Mont.

Types.—U.S.N.M. No. 56255.

Described from the female holotype and 23 female paratypes reared from the cherry maggot, *Rhagoletis fausta* (Osten Sacken), August 10, 1934, R. D. Eichman. Many of the type specimens are teneral.

TETRASTICHUS HIBUS, new species

Black or very dark brown, with faint iridescent sheen, base of gaster somewhat lighter than thorax; apex of pedicel, narrow areas at bases and apices of femora and tibiae and three basal segments of middle and hind tarsi light yellow or white.

Female.—Length, 1.8–2.2 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; first funicle segment one and one-fourth times as long as pedicel and one and one-third times as long as second funicle segment, second and third segments equal in length, club slightly shorter than second and third funicle segments combined; length of malar space two-thirds as great as height of compound eye; postocellar line one and one-half times as long as ocellocular. Pro-

notum with distinct femoral grooves, as in figure 17, *e*; mesopraescutum with surface almost smooth, obscure, somewhat longitudinal sculpturing discernible, one row of bristles present at each lateral margin; submarginal vein of forewing with four or five dorsal bristles, marginal vein four times as long as stigmal; apex of hindwing blunt, fringe at posterior margin one-fifth as wide as wing at hamuli; postscutellum somewhat flattened at meson. Surface of propodeum faintly sculptured, almost smooth, median carina only present; mesal length of propodeum one-third as great as length of mesoscutellum; spiracles contiguous with anterior margin of propodeum; gaster from one and one-third to one and one-half times as long as thorax.

Male.—Length, 1.4–2.0 mm. Anterior carina of scape short, located near apex; pedicel slightly longer than first funicle segment, second segment twice as long as first, third and fourth equal in length and each slightly longer than second; club as long as two distal funicle segments combined; funicle segments bearing conspicuously long bristles on enlargements near bases of segments; marginal vein three times as long as stigmal; gaster as long as thorax.

Type locality.—Claremont, Calif.

Types.—U.S.N.M. No. 56256.

Described from the female holotype, male allotype, and 15 female and 12 male paratypes reared from a “cup gall” on white sage (*Artemisia ludoviciana*), January 25–February 22, 1923, by J. G. Needham.

Host.—The host of this species possibly is *Diarthronomyia occidentalis* (Felt).

TETRASTICHUS CARINATUS Forbes

FIGURES 16, *d*; 20, *i*

Tetrastichus carinatus FORBES, Illinois State Ent. Rep, 1885, p. 48.—GAHAN, U. S. Dept. Agr. Misc. Publ. 174, p. 138, 1933 (this paper includes a bibliography complete through 1932).—ROCKWOOD and REEHER, U. S. Dept. Agr. Techn. Bull. 361, p. 18, 1933.—HILL, PINCKNEY, and UDINE, U. S. Dept. Agr. Techn. Bull. 689, p. 12, 1939.—HILL and PINCKNEY, U. S. Dept. Agr. Techn. Bull. 715, p. 10, 1940.

Tetrastichus rileyi LINDEMANN, Bull. Soc. Nat. Moscou, ser. 2, vol. 1, p. 183, 1887.

Body light to dark brown, sometimes black, with rather faint metallic iridescence; legs (except bases of coxae) usually entirely yellow or white, femora occasionally darkened on basal half.

Female.—Length, 0.75–2.0 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus or slightly higher; first funicle segment from one and two-fifths to one and one-half times as long as second segment, segments two and three equal in length, club slightly shorter than second and third funicle segments combined (fig. 16, *d*); length of malar

space one-half height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum as wide as long and bearing one and a partial second row of bristles at each lateral margin; prepectus reticulated, rest of mesopleuron smooth, submarginal vein of forewing with two to four dorsal bristles; mesoscutellum either with two or three pairs of bristles; hindwing blunt at apex, fringe at posterior margin usually one-fifth as wide as wing at hamuli (fig. 20, *i*). Surface of propodeum faintly sculptured, strong median carina present, paraspiracular carinae absent; mesal length of propodeum one-fourth as great as length of mesoscutellum; propodeal spiracles not quite touching anterior margin; gaster from one-quarter to one-third longer than thorax.

Male.—Length, 1.5 mm. First funicle segment two-thirds as long as second, second to fourth equal in length; pedicel and first funicle segment equal in length; club as long as third and fourth funicle segments combined; setae borne by funicle segments twice as long as segments; gaster as long as thorax.

Type locality.—Anna, Ill.

Types.—Female lectotype and one female paratype in Illinois Natural History Survey collection.

Hosts.—*Phytophaga destructor* (Say), the Hessian fly; *Phytophaga phalaris* (Barnes).

Distribution.—Probably worldwide; generally distributed in the wheat-growing areas of the United States, except those immediately west of the Mississippi River.

TETRASTICHUS REPULSUS Girault

Tetrastichus repulsus GIRAULT, New chalcid flies, p. 4, 1917.

Iridescent blue-green or purple; pedicel or entire antenna, trochanters partly, apices of femora, tibiae, and tarsi light yellow or white.

Female.—Length, 1.9–2.8 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of vertex; first funicle segment one-half longer than pedicel, second and third segments equal in length and each one-fifth shorter than first; club as long as pedicel and first funicle segment; length of malar space two-thirds as great as height of compound eye; postocellar line slightly more than twice as long as ocellular. Mesopraescutum wider than long, and bearing two rows of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-fifth as great as width of wing at hamuli. Surface of propodeum almost smooth, showing very faint reticulations under strong light; length of mesoscutellum three and one-half times as great as mesal length of

propodeum, paraspiracular carinae wanting; propodeal spiracles large, almost touching anterior margin; gaster narrow and acutely pointed, almost twice as long as thorax.

Male.—Unknown.

Type locality.—Ames, Iowa.

Types.—U.S.N.M. No. 20965.

Host.—Unknown.

Distribution.—Iowa.

Remarks.—Known only from the two type specimens.

TETRASTICHUS MALOPHILUS, new species

Very dark, iridescent blue, with antennal flagellum, apices of femora, tibiae, basal segments of tarsi, and all bristles and pubescence white or light yellow.

Female.—Length, 0.8–1.0 mm. Antennae inserted at level of ventral margins of compound eyes; scape short, its apex reaching a point only two-thirds the distance from clypeal margin to anterior ocellus; pedicel and first two funicle segments each equal in length, third segment one-fifth shorter, funicle segments as wide as long; club as long as first two funicle segments; length of postocellar line three times as great as ocellular. Spiracles clearly visible at posterolateral angles of pronotum; mesopraescutum wider than long and bearing one or two rows of bristles at each lateral margin; submarginal vein of forewing with two dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-fourth as wide as wing at hamuli. Surface of propodeum slightly roughened, faint median carina present; mesal length of propodeum one-fifth greater than length of postscutellum, and one-third as long as mesoscutellum; propodeal spiracles separated from anterior margin by a space equal to diameter of a spiracle; gaster globose (flattened in dry specimens), as long as thorax.

Male.—Unknown.

Type locality.—Milford Center, Ohio.

Types.—U.S.N.M. No. 56257.

Described from the female holotype and 4 female paratypes reared from the apple flea weevil, *Orchestes pallicornis* Say, June 24–25, 1930, by J. S. Houser.

TETRASTICHUS BRUCHOPHAGI Gahan

FIGURES 17, *d*; 21, *f*

Tetrastichus bruchophagi GAHAN, Proc. U. S. Nat. Mus., vol. 46, p. 349, 1913.—URBAHNS, Journ. Agr. Res., vol. 8, p. 277, 1917.—WILLIAMSON, Minnesota Rep. State Ent. No. 17, p. 106, 1918.—GAHAN, Ann. Ent. Soc. Amer., vol. 12, p. 167, 1919.—URBAHNS, U. S. Dept. Agr. Dept. Bull. 812, p. 17, 1920.—SWEZEY, Proc. Haw. Ent. Soc., vol. 7, p. 383, 1931.—NIKOL'SKAYA, Plant. Prot. (Russian),

No. 1, p. 109, 1932.—SWEZEY, Proc. Haw. Ent. Soc., vol. 8, p. 381, 1934.—
SOBENSON, Proc. Utah Acad. Sci., Arts, and Letters, vol. 11, p. 241, 249, 1934.—
NIKOL'SKAYA, Bull. Cent. Asia. Sci. Res., Cotton Inst. (Russian), p. 120, 1934.

Bright, iridescent blue; apices of femora, tibiae, and basal segments of tarsi, light yellow or white; occasional specimens have the metatibiae darkened; antennal scape sometimes yellow.

Female.—Length, 1.3–1.6 mm. Antennae inserted ventrad of level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus; pedicel one-third longer than first funicle segment, second segment one-sixth longer than first, third one-eighth longer than second; club one-third longer than second and third funicle segments combined; length of malar space slightly more than one-half height of compound eye; postocellar line three times as long as ocellular. Mesopraescutum slightly wider than long and bearing two rows of bristles at each lateral margin; submarginal vein of forewing with two or three dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-fourth width of wing at hamuli; disk of mesopleuron smooth, prepectus only faintly reticulated. Surface of propodeum smooth or very faintly reticulated, paraspiracular carinae absent; length of mesoscutellum three and one-half times as great as mesal length of propodeum; propodeal spiracles large, not quite touching anterior margin; length of gaster one and one-third times as long as thorax.

Male.—Length, 1.4 mm. Antennae usually entirely yellow; pedicel one-sixth longer than first funicle segment, funicle segments quadrate, second one-sixth longer than first, third and fourth equal in length and each one-eighth longer than second; setae as long as funicle segments borne on obscure basal elevations; club one-fifth longer than second and third funicle segments combined; gaster as long as, or slightly shorter than, thorax.

Type locality.—Corcoran, Calif.

Types.—U.S.N.M. No. 16357.

Host.—The clover and alfalfa chalcid, *Bruchophagus funebris* (Howard).

Distribution.—Probably worldwide; generally distributed in North America and Europe; known also from Argentina.

TETRASTICHUS MARCOVITCHI (Crawford)

Geniocerus marcovitchi CRAWFORD, Proc. U. S. Nat. Mus., vol. 48, p. 586, 1915.—
MARCOVITCH, Ann. Ent. Soc. Amer., vol. 8, p. 170, 1915.—LEONARD, New York
(Cornell) Agr. Exp. Stat. Mem. 101, p. 984, 1928.

Brown, with faint bluish iridescent luster, anterior side of scape, all of pedicel but dorsobasal area, ventral side of flagellum, mesal lobe of metanotum, bases and apices of femora and tibiae, and basal segments

of tarsi light yellow or white; anterior tibiae may be almost entirely yellow.

Female.—Length, 1.5–1.9 mm. Antennae inserted slightly dorsad of level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus; length of malar space one-half height of compound eye; postocellar line one and one-half times as long as ocellular; mesopraescutum with one row of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-third as wide as wing at hamuli. Surface of propodeum smooth, paraspicular carinae absent; spiracles touching anterior margin of propodeum; median length of propodeum one-fourth as long as mesoscutellum; gaster one and one-half times as long as thorax.

Male.—Length, approximately 1.5 mm. Small, darkened anterior carina located near apex of scape; funicle segments bearing conspicuously long bristles on enlargements near bases; gaster as long as thorax.

Type locality.—Ithaca, N. Y.

Type.—U.S.N.M. No. 18382.

Host.—This species originally was thought to be parasitic on *Tetrastichus* (*Geniocerus*) *juniperi*, or a species of *Eurytoma*, but it more likely is parasitic on some midge larvae or the larvae of *Anthonomus juniperinus* Sanborn, which develop in juniper berries.

Distribution.—Nevada, New York.

TETRASTICHUS RAPO (Walker)

FIGURE 21, c

Cirrospilus rapo WALKER, Ann. Mag. Nat. Hist., vol. 3, p. 415, 1839.

Geniocerus rapo (Walker) KURDJUMOV, Russ. Ent. Obozr. (Rev. Russe Ent.), vol. 13, p. 250, 1913 (this paper lists European synonymy).

Tetrastichus rapo (Walker) WALKER, List of the specimens of hymenopterous insects in the collection of the British Museum, Chalcidoidea, vol. 1, p. 76, 1846.—MASI, Bol. Portici Scuola Super. Agr., Lab. Zool. Gen. e Agr., vol. 3, p. 133, 1908.—SILVESTRI, Bol. Portici Scuola Super. Agr., Lab. Zool. Gen. e Agr., vol. 4, p. 281, 1910.—GAUTIER, Compt. Rend. Soc. Biol. [Paris], vol. 82, p. 720, 1919; Bull. Soc. Ent. France, 1921, p. 143.—PICARD, Bull. Soc. Ent. France, 1921, p. 206; Bull. Biol. France et Belg., vol. 56, p. 54, 1922.—GAUTIER and BONNAMOUR, Rev. Path. Veg. et Ent. Agr. France, vol. 11, p. 246, 1924.—FAURE, Compt. Rend. Soc. Biol. [Paris], vol. 93, p. 524, 1925.—FERRIÈRE and FAURE, Ann. Epiphyt., vol. 11, p. 221, 1925.—GEORGE, Bull. Soc. Hist. Nat. l'Afrique du Nord, vol. 18, p. 55, 1927.—LEONARD, New York (Cornell) Agr. Exp. Stat. Mem. 101, p. 984, 1928.—MOSS, Journ. Anim. Ecol., vol. 2, p. 210, 1933.—MUGGERIDGE, New Zealand Journ. Agr., vol. 47, p. 135, 1933.

Tetrastichus microgastris CHITTENDEN, U. S. Bur. Ent. Bull. 54 (n. s.), p. 79, 1905; U. S. Bur. Ent. Circ. 60, p. 5, 1905; U. S. Dept. Agr. Farmers' Bull. 766, p. 8, 1916.

Bright, iridescent green; base of abdomen often tan or brown; apices of femora and usually entire middle and hind tibiae white;

anterior tibiae tan or brown, middle and hind tibiae sometimes slightly darkened.

Female.—Length, 1.4–1.8 mm. Antennae inserted at level of ventral margins of compound eyes; first funicle segment as long as pedicel, all funicle segments equal in length and each as long as wide; club as long as two funicle segments combined; length of malar space three-fourths height of compound eye; postocellar line two and one-half times as long as ocellular. Mesopraescutum as long as wide and bearing two rows of bristles at each lateral margin; disk of mesopleuron smooth; submarginal vein of forewing with two or three dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-fifth as wide as wing at hamuli. Surface of propodeum smooth, paraspircular carinae wanting (fig. 21, *e*); mesal length of propodeum one-fourth length of mesoscutellum; propodeal spiracles almost round, not quite touching anterior margin; gaster equal to or slightly longer than thorax.

Male.—Length, 1.1–1.5 mm. Pedicel enlarged, globose, as long as first funicle segment, second funicle segment slightly longer than first, third and fourth segments equal and each as long as second, funicle segments subglobose, bearing setae only one-half longer than themselves; club four-fifths as long as three apical funicle segments; gaster and thorax equal in length.

Type locality.—England.

Types.—In the British Museum; specimens compared with types by Dr. Ch. Ferrière.

Host.—*Apanteles glomeratus* (Linnaeus) parasitic on the cabbage butterfly, *Pieris rapae* (Linnaeus).

Distribution.—Probably worldwide; generally distributed both in Europe and North America.

TETRASTICHUS MICRORHOPALAE Ashmead

Tetrastichus microrhopalae ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, p. 234, 1896.—CHITTENDEN, U. S. Bur. Ent. Bull. 38 (n. s.), p. 88, 1902.—GIRAULT, Societas Entomologica, vol. 31, p. 26, 1916.

Brown, with faint greenish iridescence; trochanters, apices of femora, tibiae, and basal segments of middle and hind tarsi white or yellow.

Female.—Length, 1.1–1.3 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape not reaching level of anterior ocellus, first funicle segment one-quarter shorter than pedicel, second segment equal to pedicel, third slightly longer, club equal to second and third funicle segments combined; length of malar space three-fifths height of compound eye; postocellar line three times as long as ocellular. Mesopraescutum slightly wider than long and

with one irregular row of bristles at each lateral margin; submarginal vein of forewing with two or three dorsal bristles; apex of hindwing acute, fringe at posterior margin one-third width of wing at hamuli. Surface of propodeum smooth, and with only a vague median carina; median length of propodeum slightly more than one-quarter length of mesoscutellum; propodeal spiracles round, separated from anterior margin by a space equal to diameter of a spiracle; gaster one and one-third times as long as thorax.

Male.—Length, 1.2 mm. Scape with a darkened anterior carina on its apical two-thirds; first funicle segment two-thirds as long as pedicel, second segment slightly longer than first, third and fourth equal in length and each as long as pedicel, funicle segments bearing setae as long as the segments, club as long as last three funicle segments; gaster equal in length to thorax.

Type locality.—Rosslyn, Va.

Types.—U.S.N.M. No. 41333. (Specimens in rather poor condition.)

Host.—Larvae of goldenrod leaf miner, *Microthopala xerene* (Newman).

Distribution.—Virginia.

TETRASTICHUS CHLAMYTIS Ashmead

Tetrastichus chlamytis ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, p. 234, 1896.

Dark iridescent blue; scape of female usually, pedicel, bases and apices of femora, tibiae, and basal segments of tarsi light yellow or white.

Female.—Length, 2.0 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape not reaching level of ventral margin of anterior ocellus; second and third funicle segments equal in length, first segment slightly shorter than either, club longer than two distal funicle segments; length of malar space two-thirds as great as height of compound eye; length of postocellar line twice as great as ocellocular line. Pronotum with well-marked femoral groove, as in figure 17, *e*; median longitudinal groove of mesopraescutum almost entirely obliterated, mesopraescutum as long as wide and usually bearing one row of bristles at each lateral margin, occasionally with one or two bristles mesad of each lateral row near anterior margin; submarginal vein of forewing with two dorsal bristles, marginal vein two and one-quarter times as long as stigmal vein; hindwing blunt at apex, width of fringe at posterior margin slightly less than one-fourth as great as width of wing at hamuli. Surface of propodeum smooth, or very faintly roughened, paraspicular carinae wanting; mesal length of propodeum slightly less than mesal length of metanotum and one-fifth as great as length of mesoscutellum;

propodeal spiracles well separated from anterior margin; gaster from one and two-thirds to twice as long as thorax.

Male.—Length, 1.4–1.75 mm. Pedicel and second to fourth funicle segments each equal in length, first funicle segment one-fourth shorter, funicle segments subquadrate, without conspicuously long bristles, club as long as funicle; gaster and thorax equal in length.

Type locality.—Rosslyn, Va.

Types.—U.S.N.M. No. 41334.

Hosts.—*Chlamys gibbosa* (Fabricius), *Chlamys* spp.

Distribution.—District of Columbia, Illinois, Maine, Maryland, Minnesota, Mississippi, Virginia.

TETRASTICHUS GERSTAECKERIAE Gahan

Tetrastichus gerstaeckeriae GAHAN, Proc. U. S. Nat. Mus., vol. 83, p. 485, 1936.

Very dark brown or black with iridescent blue-green reflections; antennae, trochanters, apical third of femora, tibiae, and tarsi yellow.

Female.—Length, 2.0–3.0 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus, all funicle segments equal in length and each three-fourths as long as pedicel, club as long as two funicle segments combined; postocellar line two and one-half times as long as ocellocular. Mesopraescutum as wide as long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-fifth width of wing at hamuli. Surface of propodeum smooth, or very faintly roughened, median carina only present; mesal length of propodeum one-fifth length of mesoscutellum; propodeal spiracles separated from anterior margin by a space equal to one-half diameter of a spiracle; gaster from twice to almost three times as long as thorax.

Male.—Length, 1.4 mm. Scape greatly enlarged, globular, darkened anterior carina extending from near base to apex; first funicle segment one-third shorter than pedicel, three following funicle segments equal and each one-fifth shorter than first, club as long as first two funicle segments, segments quadrate, and bearing setae no longer than those on female antennae; gaster as long as thorax.

Type locality.—Probably Uvalde, Tex.

Types.—U.S.N.M. No. 51450.

Hosts.—Cactus weevils, *Gerstaeckeria porosa* (LeConte), *Gerstaeckeria nobilis* (LeConte).

Distribution.—Texas.

TETRASTICHUS RUGGLESII Rohwer

Tetrastichus rugglesi ROHWER, Can. Ent., vol. 51, p. 160, 1919.

Brown, with purple and blue-green iridescence; antennae, trochanters, apices of femora, tibiae (except for occasional vague ring

near base), and basal segments of middle and hind tarsi white; front tarsi usually tan, gaster light brown at base.

Female.—Length, 2.0 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus; all funicle segments equal in length and each one-eighth shorter than pedicel, club as long as two distal funicle segments; postocellar line two and one-half times as long as ocellocular; length of malar space two-thirds as great as height of compound eye; mesopraescutum with two rows of bristles at each lateral margin; submarginal vein of forewing with two or three dorsal bristles; metacoxae entirely glabrous; surface of propodeum smooth, paraspircular carinae absent; propodeal spiracles large, not touching anterior margin; mesal length of propodeum one-fifth as great as length of mesoscutellum; gaster twice as long as thorax.

Male.—Length, 1.8 mm. Funicle segments with transverse basal enlargements, these bearing setae slightly longer than segments; gaster and thorax equal in length.

Type locality.—St. Paul, Minn.

Types.—U.S.N.M. No. 22132.

Hosts.—Flat-headed borers, *Agrius arcuatus* (Say), *Agrius rubicola* Abeille, *Agrius champlaini* Frost.

Distribution.—Connecticut, Minnesota, New York, West Virginia.

TETRASTICHUS THANASIMI Ashmead

Tetrastichus thanasimi ASHMEAD, Trans. Amer. Ent. Soc., vol. 21, p. 343, 1894.—

GIRAULT, Societas Entomologica, vol. 31, p. 36, 1916.

Tetrastichodes thanasimi (Ashmead) GIRAULT, Societas Entomologica, vol. 31, p. 35, 1916.

Very dark, shining brown, non-iridescent; antennae, trochanters, apices of femora, bases and apices of tibiae, and basal segments of middle and hind tarsi white or light yellow.

Female.—Length, 1.1–1.3 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; scape two and one-quarter times as long as pedicel, funicle segments becoming progressively shorter, so that third segment is two-thirds as long as first, club as long as pedicel and first funicle segment combined, length of malar space three-fourths as great as height of compound eye; postocellar line twice as long as ocellocular. Mesopraescutum with one or two rows of bristles at each lateral margin; submarginal vein of forewing with three to five dorsal bristles; marginal vein two and one-half times as long as stigmal vein; apex of hindwing blunt, fringe at posterior margin one-fourth as wide as wing at hamuli. Surface of propodeum smooth, mesal length two-fifths as great as length of mesoscutellum; paraspircular carinae wanting; spiracles separated from anterior mar-

gin by a space as great as length of a spiracle; gaster only slightly longer than thorax.

Male.—Length, 1.0 mm. All four funicle segments equal in length, semiquadrate, and without long bristles, club three-quarters as long as funicle; gaster and thorax equal in length.

Type locality.—Morgantown, W. Va.

Types.—U.S.N.M. No. 41340.

Hosts.—Larvae of clerid beetles, *Cymatodera* sp., *Thanasimus trifasciatus* Say, *Thanasimus* spp.

Distribution.—California, Montana, Pennsylvania, West Virginia.

TETRASTICHUS VARICORNIS (Girault), new combination

FIGURE 16, *f*

Epitetrastichus varicornis GIRAULT, *Descriptiones hymenopterorum chalcidoidicarum variorum cum observationibus*, pt. 3, p. 4, 1917.

Body black; part of scape, antennal club, middle and hind trochanters, bases and apices of femora and tibiae, and basal segments of middle and hind tarsi white.

Female.—Length, 1.8 mm. Antennal pedicel one-eighth longer than first funicle segment; second four-fifths as long as first, third three-fifths as long as first, each flagellar segment shorter and wider than preceding one (fig. 16, *f*), club globose, as long as second and third funicle segments combined. Mesopraescutum as long as wide and bearing one row of bristles at each lateral margin; submarginal vein of forewing with five dorsal bristles; apex of hindwing blunt, fringe at posterior margin one-fifth as wide as wing at hamuli. Surface of propodeum lightly shagreened; mesal length of propodeum slightly greater than that of postscutellum, and one-fourth as great as length of mesoscutellum; propodeal spiracles small, almost contiguous with anterior margin; gaster as long as thorax.

Male.—Unknown.

Type locality.—Glenn Dale, Md.

Type.—U.S.N.M. No. 20858. (Specimen in poor condition.)

Host.—Unknown.

Distribution.—Maryland.

Remarks.—Only known from the unique type specimen; additional material may greatly alter the conception of this species.

TETRASTICHUS NEUROTERTI (Ashmead), new combination

Hyperteles neuroteri ASHMEAD, *Trans. Amer. Ent. Soc.*, vol. 14, p. 203, 1887.

Dull brown or black, noniridescent; apices of coxae, trochanters, bases and apices of femora and tibiae, and basal segments of tarsi light yellow or white.

Female.—Length, 1.1–1.3 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of ventral margin of anterior ocellus; all funicle segments subequal in length; club as long as first two funicle segments combined; length of malar space two-fifths height of compound eye; postocellar line twice as long as ocellocular. Mesopraescutum as wide as long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with three or four dorsal bristles; marginal vein four times as long as stigmal vein; apex of hindwing blunt, fringe at posterior margin one-fourth width of wing at hamuli. Surface of propodeum smooth, paraspiracular carinae wanting; mesal length of propodeum one-third length of mesoscutellum; propodeal spiracles contiguous with anterior margin; gaster short, globose, one-third longer than thorax.

Male.—Length, 0.8 mm. Scape with darkened anterior carina short, located near apex; pedicel one-fifth longer than first funicle segment, second to fourth segments equal and each twice as long as first segment, funicle segments enlarged near bases and bearing long setae; club as long as last two funicle segments; gaster and thorax equal in length.

Type locality.—Jacksonville, Fla.

Types.—U.S.N.M. No. 25953.

Hosts.—Jumping bullet gall, *Neuroterus saltarius* Weld, on *Quercus undulata*; *Neuroterus rileyi* Bassett on *Quercus stellata*; also a series was said to have come from peppergrass seeds, but that record is probably incorrect. The host name mentioned for this species in the original description, *Neuroterus atomus* Ashmead, is a nomen nudum.

Distribution.—District of Columbia, Florida, Illinois, Missouri, New York, Virginia.

TETRASTICHUS SILVATICUS Gahan

Tetrastichus silvaticus GAHAN, Proc. Ent. Soc. Washington, vol. 39, p. 266, 1937.—HODSON, Ann. Ent. Soc. Amer., vol. 32, p. 131, 1939 (*sylvaticus*).

Black, noniridescent; variable areas on pedicel and basal segments of flagellum, trochanters, bases and apices of femora and tibiae, and basal segments of tarsi light yellow or white.

Female.—Length, 1.1 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape reaching level of anterior ocellus; first funicle segment one-third shorter than pedicel and one-sixth longer than second segment, second and third equal in length; club as long as second and third funicle segments combined; length of malar space one-half as great as height of compound eye; postocellar line twice as long as ocellocular. Mesopraescutum wider than long, provided with one row of bristles at each lateral margin; submarginal vein of forewing with two or three dorsal bristles; marginal

vein three and one-half times as long as stigmal vein; apex of hindwing blunt, width of fringe at posterior margin one-third as great as width of wing at hamuli. Surface of propodeum faintly reticulated, sometimes smooth, paraspircular carinae wanting; mesal length of propodeum one-third as great as length of mesoscutellum; propodeal spiracles almost contiguous with anterior margin; gaster one and one-third to one and one-half times as long as thorax.

Male.—Length, 1.0 mm. Pedicel one-sixth longer than first funicle segment; second to fourth segments equal in length and each one-third longer than first, funicle segments enlarged near bases and bearing long setae; club as long as three distal funicle segments; gaster slightly shorter than thorax.

Type locality.—Ely, Minn.

Types.—U.S.N.M. No. 52253.

Host.—Eggs of the forest tent caterpillar, *Malacosoma disstria* (Huebner).

Distribution.—Minnesota, New Brunswick, Vermont.

TETRASTICHUS NEBRASKENSIS (Girault), new combination

Neomphaloidella nebraskensis GIRAULT, Can. Ent., vol. 48, p. 103, 1916.

Usually entirely dull brown, sometimes almost black; area around mouthparts, trochanters, bases and apices of femora, tibiae, and basal segments of tarsi light yellow or white; metatibiae often partly brown; mesal area of postscutellum and base of abdomen usually yellow, always somewhat lighter in color than dorsum of thorax.

Female.—Length, 1.5–1.8 mm. First funicle segment as long as pedicel, second and third segments equal in length and each three-fourths as long as first; club as long as first two funicle segments; length of malar space one-half as great as height of compound eye; postocellar line one and one-half times as long as ocellocular. Mesopraescutum slightly wider than long and bearing one row of bristles at each lateral margin; submarginal vein of forewing with from three to five dorsal bristles; marginal vein three times as long as stigmal vein; hindwing blunt at apex, fringe at posterior margin one-fourth as wide as wing at hamuli; both pairs of mesoscutellar bristles located posterior to midpoint of mesoscutellum. Surface of propodeum almost smooth; paraspircular carinae wanting; mesal length of propodeum one-third as great as length of mesoscutellum; propodeal spiracles contiguous with anterior margin; thorax two-thirds as long as gaster.

Male.—Unknown.

Type locality.—Lincoln, Nebr.

Types.—U.S.N.M. No. 19919.

Host.—Either the clover seed midge, *Dasyneura leguminicola* (Lintner), or the clover leaf weevil, *Hypera nigrirostris* (Fabricius). The former is probably the true host.

Distribution.—Indiana, Kansas, Nebraska, New Brunswick, Oregon, Washington.

TETRASTICHUS ROSAE Ashmead

Tetrastichus rosae ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 134, 1886.—
CRESSON, Synopsis of families and genera of Hymenoptera, p. 245, 1887.

Brown or black, noniridescent; apices of coxae, trochanters, bases and apices of femora, tibiae, and basal segments of tarsi, light yellow or white; color of legs somewhat variable; middle and hind tibiae may be slightly darkened, and femora sometimes almost entirely yellow.

Female.—Length, 1.8 mm. Antennae inserted slightly ventrad of level of ventral margins of compound eyes; apex of scape not quite reaching level of anterior ocellus; pedicel and all funicle segments equal in length; club three-fourths as long as funicle; length of malar space three-fourths as great as height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum as long as wide and bearing a single row of setae at each lateral margin; submarginal vein of forewing with four to six dorsal bristles, marginal vein thickened at base and three and one-half times as long as stigmal vein; apex of hindwing blunt, width of fringe at posterior margin one-fourth width of wing at hamuli. Propodeum lightly reticulated, paraspircular carinae absent; mesal length of propodeum one-third length of mesoscutellum; propodeal spiracles almost touching anterior margin; gaster narrow, acutely pointed, twice as long as thorax.

Male.—Unknown. The male specimens mentioned in the original description are not conspecific with the female.

Type locality.—Jacksonville, Fla.

Type.—U.S.N.M. No. 2843. The type series is mixed; a lectotype female has, therefore, been designated.

Hosts.—Mealy rose gall, *Diplolepis ignotus* (Osten Sacken); *Diplolepis ostensackeni* (Beutenmüller).

Distribution.—Colorado, District of Columbia, Florida, Idaho, Michigan, Virginia.

TETRASTICHUS BLASTOPHAGI (Ashmead)

Hyperteles blastophagi ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 202, 1887.
Tetrastichus blastophagi (Ashmead) GIBALT, Societas Entomologica, vol. 31, p. 35, 1916.

Body light brown, noniridescent; antennae, apices of femora, tibiae, and basal segments of tarsi light yellow or white; metatibiae may be slightly darkened.

Female.—Length, 1.2–1.4 mm. Antennae inserted at level of ventral margins of compound eyes; apex of scape almost reaching level of anterior ocellus; pedicel and first funicle segment equal in length, second segment slightly shorter than first, third funicle segment as long as first; club as long as second and third funicle segments combined; length of malar space slightly less than one-half height of compound eye; postocellar line twice as long as ocellular. Mesopraescutum slightly wider than long and bearing one row of bristles at each lateral margin, median groove well defined; submarginal vein of forewing with from three to five dorsal bristles; apex of hindwing blunt, width of fringe at posterior margin one-fourth as great as width of wing at hamuli. Surface of propodeum smooth, paraspiracular carinae wanting, median carina vague; mesal length of propodeum one-fifth length of mesoscutellum; propodeal spiracles contiguous with anterior margin; gaster globose (flattened in dry specimens), its length one-third greater than that of thorax.

Male.—Length, 1.0 mm. Abdomen slightly lighter in color at base. Pedicel of antenna globular, twice as long as first funicle segment, second to fourth funicle segments equal in length and each one-fifth longer than pedicel, funicle segments enlarged near bases, and bearing long setae on these enlargements; club as long as three apical funicle segments; apex of scape reaching level of dorsal margin of anterior ocellus; gaster equal in length to thorax.

Type locality.—Jacksonville, Fla.

Types.—U.S.N.M. No. 25954.

Host.—*Callirhytis blastophaga* (Ashmead), the staminate flower gall of *Quercus cinerea*.

Distribution.—District of Columbia, Florida.

TETRASTICHUS LASIUS, new name

Tetrastichodes lasiopterae ASHMEAD, Journ. Cincinnati Soc. Nat. Hist., vol 17, p. 54, 1894.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 1898. [Not *Tetrastichus* (*Geniocerus*) *lasiopterae* (Lindemann) Dalla Torre.]

Almost completely brown; area of head around mouth parts, median area of postscutellum, and legs almost white; femora and tibiae slightly darkened.

Apex of scape reaching level of anterior ocellus; all funicle segments equal in length; mesopraescutum with one row of bristles at each lateral margin; submarginal vein of forewing with four or five dorsal bristles; apex of hindwing blunt; propodeum almost smooth, minutely roughened; median carina only present, spiracles contiguous with anterior margin of propodeum.

Male antenna bearing conspicuously long bristles on elevations near bases of funicle segments.

Type locality.—Cincinnati, Ohio.

Types.—U.S.N.M. No. 56258.

Host.—Grass midge, *Asteromyia agrostis* (Osten Sacken), on *Muhlenbergia* and *Distichlis*.

Distribution.—Ohio.

TETRASTICHUS JUNIPERI (Crawford)

Geniocerus juniperi CRAWFORD, Proc. U. S. Nat. Mus., vol. 48, p. 585, 1915.—

MARCOVITCH, Ann. Ent. Soc. Amer., vol. 8, p. 169, 1915.—LEONARD, New York (Cornell) Agr. Exp. Stat. Mem. 101, p. 984, 1928.

(?) *Epitetrastichus silvae* GIRAULT, in Felt, New York State Mus. Bull. 200, p. 21, 1917 (manuscript name).

This species differs from *T. marylandensis* (Girault), redescribed on p. 598, only in having the apex of the antennal scape reaching the level of the dorsal margin of the anterior ocellus, the first funicle segment one and one-third times as long as the second, and the propodeum one-fourth as long as the mesoscutellum, rather than only one-fifth as long.

Type locality.—Ithaca, N. Y.

Types.—U.S.N.M. No. 18381.

Host.—*T. juniperi* was originally thought to be phytophagous and develop in juniper berries. This species is more likely to be parasitic on some midge larvae or *Anthonomus juniperinus* Sanborn, which develop in the juniper berries.

Distribution.—New York, Oregon.

TETRASTICHUS IMPEXUS Girault

Tetrastichus impexus GIRAULT, New chalcid flies, p. 2, 1917.

Dark brown, noniridescent; mouthparts and area on head immediately around them, bases and apices of femora and tibiae, and mesal area of postscutellum yellow.

Female.—Length, 2.2 mm. Apex of scape not reaching level of anterior ocellus; first funicle segment as long as pedicel, second segment slightly longer than first, third as long as first, club as long as pedicel and first funicle segment combined; mesopraescutum as long as wide and bearing one row of bristles at each lateral margin; marginal vein of forewing with three or four dorsal bristles; mesal length of propodeum one-third as great as length of mesoscutellum; spiracles contiguous with anterior margin, paraspircular carinae wanting; gaster one-third longer than thorax.

Male.—Unknown.

Type locality.—Falls Church, Va.

Type.—U.S.N.M. No. 21066. (Specimen in poor condition.)

Host.—Gall of *Disholcaspis globulus* (Fitch) on *Quercus stellata*.

Distribution.—Virginia.

Remarks.—Known only from the single type specimen.

TETRASTICHUS MARYLANDENSIS (Girault)

Epitetrastichus marylandensis GIRAULT, Ann. Ent. Soc. Amer., vol. 9, p. 295, 1916.—FENNAH, Rep. St. Lucia Agr. Dept. for 1938, p. 35, 1939; for 1939, p. 25, 1940.

Epitetrastichus cuneiformis GIRAULT, Descriptiones stellarum novarum, p. 18, 1917. (New synonymy.)

Tetrastichus marylandensis (Girault) FENNAH, Rep. St. Lucia Dept. Agr. for 1938, p. 35, 1939; for 1939, p. 25, 1940.

Body usually almost entirely yellow, with variable light brown areas on head and thorax, transverse brown stripes on dorsum of gaster, occasional specimens almost entirely brown; legs usually entirely yellow, femora sometimes darkened; males usually entirely brown, occasionally almost entirely yellow.

Female.—Length, 1.0–1.85 mm. Apex of antennal scape not quite-reaching level of anterior ocellus, all funicle segments subequal in length; mesopraescutum with one row of bristles at each lateral margin; submarginal vein of forewing with three to five dorsal bristles; propodeum smooth, paraspiracular carinae wanting, spiracles touching anterior margin of propodeum, mesal length of propodeum one-fifth as great as length of mesoscutellum; gaster acutely pointed, longer than thorax.

Male.—Length, 0.8–1.5 mm. Funicle segments bearing conspicuously long setae near bases; gaster as long as thorax.

Type locality.—Glenn Dale, Md.

Type.—U. S. N. M. No. 19935.

Hosts.—The host records for this species are somewhat confusing; *T. marylandensis* is said to have come from various unidentified midge larvae, as well as from the pine twig moth, *Rhyacionia frustrana* (Comstock), the pine leaf miner, *Exoteleia pinifoliella* (Chambers), the corn leaf aphid, *Aphis maidis* Fitch, and eggs of various Lepidoptera and Coleoptera. Some of those records undoubtedly are wrong.

Distribution.—District of Columbia, Illinois, Maryland, Massachusetts, Mississippi, Missouri, Virginia.

HOST LIST

The following list contains the information at present available concerning the hosts for the various species of *Tetrastichus*. These hosts are heterogeneous, ranging from the Orthoptera to the Hymenoptera and Diptera, and include even some spiders. There is, also, no uniformity in the particular stage of the host that is affected.

Species of this genus have been reared from the eggs, larvae, nymphs, pupae, and (very rarely) adults of other insects. A number of the species of *Tetrastichus* are hyperparasites. Further rearing work and study very well may show that some of the species of *Tetrastichus* now thought to be primary parasites are actually secondary.

Known hyperparasites in this list are indicated by a dagger, and the primary host (when known) is given in parentheses; an asterisk is placed before those species which are probably or possibly secondary parasites; and those species having a questionable host record are indicated by a double dagger.

*Host**Parasite*

ORTHOPTERA

<i>Blatta orientalis</i> Linnaeus	<i>hagenowii</i> (Ratzeburg)
<i>Blattella germanica</i> (Linnaeus)	<i>hagenowii</i> (Ratzeburg)
<i>Oecanthus</i> sp.	<i>oecanthivorus compar</i> Gahan
<i>Periplaneta americana</i> (Linnaeus)	<i>hagenowii</i> (Ratzeburg)
<i>Periplaneta australasiae</i> (Fabricius)	<i>hagenowii</i> (Ratzeburg)

ODONATA

<i>Lestes</i> sp.	<i>polynemae</i> Ashmead
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THYSANOPTERA

<i>Gynaikothrips uzeli</i> (Zimmerman)	<i>thripophonus</i> Waterston
<i>Liothrips laureli</i> (Mason)	<i>thripophonus</i> Waterston
<i>Liothrips urichi</i> Karny	<i>thripophonus</i> Waterston

HOMOPTERA

<i>Aphis gossypii</i> Glover	* <i>minutus</i> (Howard)
<i>Aphis maidis</i> Fitch	‡ <i>marylandensis</i> (Girault)
<i>Aphis pomi</i> De Geer	* <i>minutus</i> (Howard)
<i>Aphis</i> spp.	* <i>minutus</i> (Howard)
<i>Calophya nigripennis</i> Riley	‡ <i>triozae</i> Burks
<i>Lecanium corni</i> Bouché	* <i>minutus</i> (Howard)
<i>Lecanium nigrofasciatum</i> Pergande	* <i>minutus</i> (Howard)
<i>Lecanium persicae</i> (Fabricius)	* <i>minutus</i> (Howard)
<i>Paratrioza cockerelli</i> (Sulc)	<i>triozae</i> Burks
<i>Phenacoccus acericola</i> (King)	* <i>minutus</i> (Howard)
<i>Phenacoccus helianthi</i> Cockerell	* <i>minutus</i> (Howard)
<i>Physokermes insignicola</i> (Crawford)	* <i>minutus</i> (Howard)
<i>Pulvinaria bigeloviae</i> Cockerell	* <i>minutus</i> (Howard)
<i>Suisselia oleae</i> (Bernard)	* <i>minutus</i> (Howard)
<i>Trioxa</i> spp.	<i>dyrus</i> Burks
	<i>getastus</i> Burks

NEUROPTERA

<i>Chrysopa oculata</i> Say	<i>chrysopae</i> (Crawford)
<i>Chrysopa plorabunda</i> Fitch	<i>chrysopae</i> (Crawford)
<i>Chrysopa rufilabris</i> Burmeister	<i>chrysopae</i> (Crawford)
<i>Malacomysa westwoodi</i> (Fitch)	<i>cacrulescens</i> Ashmead

Host

Parasite

COLEOPTERA

<i>Agrilus arcuatus</i> (Say)	<i>rugglesi</i> Rohwer
<i>Agrilus champlaini</i> Frost	<i>rugglesi</i> Rohwer
<i>Agrilus rubicola</i> Abeille	<i>rugglesi</i> Rohwer
<i>Agrilus sinuatus</i> Olivier	<i>agrili</i> Crawford
<i>Anthonomus grandis</i> Boheman	<i>hunteri</i> Crawford
<i>Anthonomus juniperinus</i> Sanborn	‡ <i>marcovitchi</i> (Crawford)
	‡ <i>juniperi</i> (Crawford)
<i>Apion</i> sp.	* <i>caeruleseens</i> Ashmead
<i>Blepharida rhois</i> (Forster)	<i>ovipransus</i> Crosby and Leonard
<i>Chirida signifera</i> (Herbst)	<i>cassidis</i> Burks
<i>Chlamys gibbosa</i> (Fabricius)	<i>chlamytis</i> Ashmead
<i>Chlamys</i> sp.	<i>chlamytis</i> Ashmead
<i>Chrysobothris femorata</i> Olivier	<i>holbeini</i> Girault
<i>Chrysobothris mali</i> Horn	<i>holbeini</i> Girault
<i>Chrysobothris</i> sp.	<i>holbeini</i> Girault
<i>Coccinella 5-notata</i> Kirby	<i>melanis</i> Burks
<i>Coccinella</i> sp.	<i>melanis</i> Burks
<i>Compsus auricephalus</i> (Say)	<i>compsivorus</i> Crawford
<i>Criocoris asparagi</i> (Linnaeus)	‡ <i>asparagi</i> Crawford
<i>Cycloneda sanguinea</i> (Linnaeus)	<i>minutus</i> (Howard)
<i>Cylindrocopturus adpersus</i> (LeConte)	<i>ainsliei</i> Gahan
<i>Cymatodera</i> sp.	<i>thanasimi</i> Ashmead
<i>Galerucella xanthomelaena</i> (Schrank)	<i>brexistigma</i> Gahn
	<i>xanthomelaenae</i> (Rondani)
<i>Gerstaeckeria nobilis</i> (LeConte)	<i>gerstaeckeriae</i> Gahan
<i>Gerstaeckeria porosa</i> (LeConte)	<i>gerstaeckeriae</i> Gahan
<i>Hypera nigritrostris</i> (Fabricius)	‡ <i>nebraskensis</i> (Girault)
<i>Languria mozardi</i> (Latreille)	<i>gibboni</i> (Girault)
<i>Mettriona bicolor</i> (Fabricius)	<i>cassidis</i> Burks
<i>Microrhopala xerene</i> (Newman)	<i>microrhopalae</i> Ashmead
<i>Mordellistena pustulata</i> Melsheimer	<i>ainsliei</i> Gahan
<i>Mordellistena</i> sp.	<i>ainsliei</i> Gahan
<i>Orchestes pallicornis</i> (Say)	<i>malophilus</i> Burks
	<i>xanthops</i> Ratzeburg
<i>Physonota unipunctata</i> (Say)	<i>whitmani</i> (Girault)
<i>Scolytus rugulosus</i> Ratzeburg	<i>scolyti</i> Ashmead
<i>Thanasimus trifasciatus</i> Say	<i>thanasimi</i> Ashmead
<i>Thanasimus</i> sp.	<i>thanasimi</i> Ashmead
<i>Tychius lincellus</i> LeConte	* <i>caeruleseens</i> Ashmead

LEPIDOPTERA

<i>Ancyliis comptana</i> (Froelich)	<i>dolosus</i> Gahan
<i>Barbara colfaxiana</i> (Kearfott)	<i>strobilus</i> Burks
<i>Coleophora malivorella</i> Riley	<i>caeruleseens</i> Ashmead
<i>Coloradia pandora</i> Blake	<i>pandora</i> Burks
<i>Exoteleia pinifoliella</i> (Chambers)	‡ <i>marylandensis</i> (Girault)
<i>Fascista cercerisella</i> (Chambers)	<i>dolosus</i> Gahan
<i>Gnorimoschema gallaesolidaginis</i> (Riley)	* <i>paracholus</i> Burks
<i>Malacosoma americana</i> (Fabricius)	<i>malacosomae</i> Girault
<i>Malacosoma disstria</i> Huebner	<i>malacosomae</i> Girault
	<i>silvaticus</i> Gahan
<i>Malacosoma fragilis</i> Stretch	<i>malacosomae</i> Girault

Host

Parasite

LEPIDOPTERA—Continued

<i>Paraleucoptera albella</i> (Chambers)	‡ <i>punctatifrons</i> (Girault)
<i>Rhyacionia frustrana</i> (Comstock)	‡ <i>marylandensis</i> (Girault)
<i>Rhyacionia frustrana bushnelli</i> (Busck)	<i>longicarpus</i> (Girault)
<i>Rhyacionia buoliana</i> (Schiffermuller)	<i>turionum</i> (Hartig)

DIPTERA

<i>Asphondylia bea</i> Felt	‡ <i>sobrius</i> Gahan
<i>Asphondylia websteri</i> Felt	<i>sobrius</i> Gahan
	‡ <i>venustus</i> Gahan
<i>Asteromyia agrostis</i> (Osten Sacken)	<i>lasius</i> Burks
<i>Asteromyia carbonifera</i> (Felt)	<i>funipennis</i> (Girault)
<i>Asteromyia</i> sp.	<i>tesserus</i> Burks
<i>Cecidomyia</i> sp.	<i>tesserus</i> Burks
<i>Dasyneura leguminicola</i> (Lintner)	‡ <i>nebraskensis</i> (Girault)
<i>Diarthronomyia hypogaea</i> (Loew)	<i>diarthronomyiae</i> Gahan
<i>Diarthronomyia occidentalis</i> (Felt)	‡ <i>hibus</i> Burks
<i>Eurosta solidaginis</i> (Fitch)	* <i>solidaginis</i> Burks
<i>Lasioptera</i> sp.	<i>tesserus</i> Burks
<i>Monarthropalpus buxi</i> (Laboulbene)	<i>flora</i> (Girault)
<i>Phytophaga destructor</i> (Say)	<i>ainsliei</i> Gahan
	<i>carinatus</i> Forbes
	‡ <i>productus</i> Riley
<i>Rhagoletis fausta</i> (Osten Sacken)	<i>faustus</i> Burks
"Syrphid," undetermined	<i>acneoviridis</i> (Girault)

HYMENOPTERA

<i>Amphibolips cinereae</i> (Ashmead)	<i>racemariae</i> Ashmead
<i>Amphibolips prunus</i> (Walsh)	<i>racemariae</i> Ashmead
<i>Amphibolips racemaria</i> (Ashmead)	<i>racemariae</i> Ashmead
<i>Anagyrus</i> sp.	
(<i>Pseudococcus maritimus</i> (Ehrhorn))	‡ <i>minutus</i> (Howard)
<i>Andricus californicus</i> Bassett	<i>gigas</i> Burks
<i>Andricus flocci</i> (Walsh)	<i>racemariae</i> Ashmead
<i>Andricus kingi</i> Bassett	<i>spilopteris</i> Burks
<i>Andricus lasius</i> Ashmead	<i>racemariae</i> Ashmead
<i>Apanteles atalantae</i> (Packard)	
(<i>Vanessa atalanta</i> (Linnaeus))	‡ <i>modestus</i> Howard
<i>Apanteles carpatus</i> (Say)	
(<i>Tinea fuscipunctella</i> Haworth)	
(<i>Tinea pellionella</i> Linnaeus)	‡ <i>carpatus</i> Burks
(<i>Tineola biselliella</i> Hummel)	
<i>Apanteles glomeratus</i> (Linnaeus)	
(<i>Pieris rapae</i> (Linnaeus))	‡ <i>rapo</i> (Walker)
<i>Apanteles</i> sp.	
(<i>Apatela americana</i> (Harris))	‡ <i>tibialis</i> (Ashmead)
(<i>Desmia funeralis</i> Huebner)	‡ <i>modestus</i> Howard
(<i>Polygona interrogationis</i> (Fabricius))	‡ <i>modestus</i> Howard
(various Lepidoptera)	‡ <i>caeruleus</i> Ashmead
<i>Aphyus lounsburyi</i> (Howard)	
(<i>Lecanium</i> sp.)	‡ <i>minutus</i> (Howard)
<i>Arge dulciaria</i> (Say)	<i>hylotomae</i> (Ashmead)
<i>Arge pectoralis</i> (Leach)	<i>hylotomae</i> (Ashmead)

Host

Parasite

HYMENOPTERA—Continued

<i>Aulacidica podagrae</i> (Bassett)	<i>cornus</i> Burks
<i>Bruchophagus funebris</i> (Howard)	<i>bruchophagi</i> Gahan
<i>Callirhytis bicornis</i> McCracken and Egbert	‡ <i>trenustus</i> Gahan
<i>Callirhytis blastophaga</i> (Ashmead)	<i>spilopteris</i> Burks
<i>Callirhytis pomiformis</i> (Bassett)	<i>blastophagi</i> (Ashmead)
<i>Chrysocharis</i> sp.	<i>racemariae</i> Ashmead
<i>Diptolepis cehina</i> (Osten Sacken)	<i>pattersonae</i> Fullaway
<i>Diptolepis ignotus</i> (Osten Sacken)	† <i>xanthops</i> (Ratzeburg)
<i>Diptolepis ostensackeni</i> (Beutenmüller)	<i>pattersonae</i> Fullaway
<i>Disholcaspis chrysolepidis</i> (Beutenmüller)	<i>rosae</i> Ashmead
<i>Disholcaspis cinerosa</i> (Bassett)	‡ <i>pattersonae</i> Fullaway
<i>Disholcaspis globulus</i> Fitch	<i>phagus</i> Burks
<i>Disholcaspis mamma</i> (Walsh)	<i>impevus</i> Girault
<i>Dryophanta emoryi</i> Ashmead	<i>phagus</i> Burks
<i>Dryophanta polita</i> (Bassett)	<i>racemariae</i> Ashmead
<i>Euplectrus comstockii</i> Howard	‡ <i>ichthys</i> Burks
(<i>Caradrina</i> sp.)	<i>racemariae</i> Ashmead
<i>Euplectrus plathypenae</i> Howard	† <i>dosolus</i> Gahan
(<i>Plathypena scabra</i> (Fabricius))	† <i>dosolus</i> Gahan
(various Lepidoptera)	† <i>euplectri</i> Gahan
<i>Euplectrus</i> sp.	
(<i>Lina scripta</i> (Fabricius))	‡ <i>scriptus</i> Burks
(<i>Palaecrita vernata</i> (Peck))	† <i>dosolus</i> Gahan
<i>Fenusa ulmi</i> (Sundevall)	<i>xanthops</i> (Ratzeburg)
<i>Heteroccus pacificus</i> Ashmead	<i>phagus</i> Burks
<i>Meteorus</i> sp.	
(various Lepidoptera)	† <i>euplectri</i> Gahan
<i>Microbracon gelechiae</i> (Ashmead)	† <i>caeruleus</i> Ashmead
(<i>Canarsia hammondi</i> Riley)	† <i>caeruleus</i> Ashmead
Microbracon sp.	‡ <i>hyloinae</i> (Ashmead)
<i>Neodiprion</i> sp.	<i>racemariae</i> Ashmead
<i>Neuroterus batatus</i> Fitch	<i>verrucarii</i> Balduf
<i>Neuroterus floccosus</i> (Bassett)	<i>verrucarii</i> Balduf
<i>Neuroterus niger</i> Gillette	‡ <i>ichthys</i> Burks
<i>Neuroterus rileyi</i> (Bassett)	<i>neuroteri</i> (Ashmead)
<i>Neuroterus sallarius</i> Weld	<i>neuroteri</i> (Ashmead)
<i>Neuroterus sallatorius</i> Riley	<i>spilopteris</i> Burks
<i>Neuroterus varians</i> Kinsey	<i>verrucarii</i> Balduf
<i>Neuroterus verrucarum</i> (Osten Sacken)	<i>baldufi</i> Burks
<i>Phanagenia bombycina</i> (Cresson)	<i>verrucarii</i> Balduf
<i>Phanomeris phyllotomae</i> Muesebeck	* <i>johnsoni</i> Ashmead
(<i>Phyllotoma</i> sp.)	† <i>xanthops</i> (Ratzeburg)
<i>Phyllotoma nemorata</i> (Fallen)	<i>xanthops</i> (Ratzeburg)

ARANEAE

"Argiopid," undetermined

**banksii* Howard

UNPLACED SPECIES

The following species cannot be placed satisfactorily from the published descriptions, and the types are lost, too broken to be of much assistance in identifying the species, or not at present available to me for study. Specific differences are so obscure and critical in this genus that the placing of species is impossible unless the types for all the species are available for study together.

TETRASTICHUS ACUTUS Ashmead

Tetrastichus acutus ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 34, 1886.—
CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 245, 1887.

This species was described from a male specimen from Florida; the type is lost.

TETRASTICHUS ALASKENSIS Ashmead

Tetrastichus alaskensis ASHMEAD, Proc. Acad. Sci. Washington, vol. 4, p. 146, 1902.

Type.—U.S.N.M. No. 5529; this type, a male, from Popof Island, Alaska, July 19, is too badly broken to be placed.

TETRASTICHUS ANTHRACINUS Ashmead

Tetrastichus anthracinus ASHMEAD, Proc. Acad. Sci. Washington, vol. 4, p. 146, 1902.—(?) BURKE, Journ. Econ. Ent., vol. 13, p. 384, 1920.

Type.—U.S.N.M. No. 5528; described from a single female from Seldovia, Alaska, July 7. This specimen is too broken to be recognizable.

TETRASTICHUS CANADENSIS Ashmead

Tetrastichus canadensis ASHMEAD, in Howard, Ent. News, vol. 17, p. 292, 1906; Redia, vol. 3, p. 390, 1906.—BARROETAVEÑA and GIROLA, Bol. Argentina Min. de Agr., vol. 20, p. 314, 1916.

This evidently is a manuscript name; the name has been quoted at least three times, but never with a description. The host originally cited by Howard was *Diaspis pentagona* Targioni-Tozzetti. There are, in the National Museum, five specimens bearing the name *Tetrastichus canadensis* Ashmead, in Ashmead's handwriting, but these specimens were reared from a gall on the leaves of *Rosa*. The exact status of this name cannot, therefore, be determined.

TETRASTICHUS CENTRICOLAE (Ashmead), new combination

Baryscapus centricolae ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 202, 1887.

Type locality.—Asheville, N. C.

Type.—U.S.N.M. No. 51756. (Specimen much broken.)

Host.—*Dryophanta centricola* (Osten Sacken).

TETRASTICHUS EPIDIUS Walker

Tetrastichus epidius WALKER, Ann. Mag. Nat. Hist., vol. 20, p. 28, 1847.—HOWARD, U. S. Bur. Ent. Bull. 5, p. 47, 1885.—CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 245, 1887.

The types, two females from Florida, were in the British Museum in 1938. At that time, Dr. Ferrière sent the following notes: "The entire body finely and closely punctate, also the propodeum and the abdomen. Median furrow of mesonotum (mesopraescutum) very weak. Inner furrows on scutellum also weak, visible only at apical half; outer furrows strong. Propodeum short; middle carina well marked; no lateral (paraspiracular) carinae; spiracles small and round . . . Abdomen elongate and pointed at apex."

TETRASTICHUS FLAVIPES Ashmead

Tetrastichus flavipes ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 135, 1886.—CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 245, 1887. *Ceraninus flavipes* (Ashmead) ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 202, 1887.

Ceraninus flaviceps ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 202, 1887.

T. flavipes was described from a female specimen from Florida; the type has subsequently been lost. The name *flaviceps*, published without description, was undoubtedly a misspelling of *flavipes*.

TETRASTICHUS FLAVOPICTUS (Ashmead), new combination

Ceraninus flavopictus ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 202, 1887.—GIRAULT, Ann. Ent. Soc. Amer., vol. 9, p. 300, 1916.

No types for this species can be found; in 1916 Girault stated, "types too mutilated to place . . . Species hopeless."

TETRASTICHUS GALA Walker

Tetrastichus gala WALKER, Ann. Mag. Nat. Hist., vol. 20, p. 28, 1847.—HOWARD, U. S. Bur. Ent. Bull. 5, p. 47, 1885.—CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 245, 1887.

The type, a single female from Florida, was in the British Museum in 1938. Dr. Ferrière kindly furnished the following notes: "Body reddish yellow, more or less brownish in the thoracic sutures and on the sides of the propodeum near the postscutellum (metanotum); abdomen with transverse brown stripes. Hindwing acute at apex. Propodeum short, almost smooth; median carina short; no lateral (paraspiracular) carinae."

This species is evidently close to, or identical with, that called *T. marylandensis* Girault in this synopsis.

TETRASTICHUS GRANULATUS Walker

Tetrastichus granulatus WALKER, Ann. Mag. Nat. Hist., vol. 14, p. 17, 1844.—HOWARD, U. S. Bur. Ent. Bull. 5, p. 47, 1885.—CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 245, 1887.

The types of this species, three females from Hudson Bay, Canada (Barnstone), were in the British Museum in 1938. Dr. Ferrière furnished these notes: "Hindwings acute at apex. Propodeum very finely shagreened, almost smooth; median carina weak and short; no carina between it and the spiracles."

TETRASTICHUS HAEMON Walker

Tetrastichus haemon WALKER, Ann. Mag. Nat. Hist., vol. 20, p. 28, 1847.—HOWARD, U. S. Bur. Ent. Bull. 5, p. 47, 1885 [*laemon*].—CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 245, 1887.

The types, three females and a male from Florida, were in the British Museum in 1938. Dr. Ferrière was at that time of the opinion that the species should be placed in *Horismenus*, as the mesopraescutum has no median furrow, and the mesoscutellum has a median furrow.

TETRASTICHUS MICROCOSMUS Girault

Tetrastichus microcosmus GIRAULT, Descriptions stellarum novarum, p. 22, 1917 (new name for *T. granulatus* Ashmead, preoccupied).

This name probably was proposed to be applied to *Aprostocetus granulatus* Ashmead at a time when Girault considered *Aprostocetus* and *Tetrastichus* not generically distinct. In no published work, however, have these two genera been combined, and I do not consider them synonymous.

TETRASTICHUS SAUNDERSII (Packard)

Eulophus saundersii PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, p. 34, 1881; HOWARD, U. S. Bur. Ent. Bull. 5, p. 46, 1885.—CRESSON, Synopsis of families and genera of Hymenoptera, . . . , p. 244, p. 1887.

Tetrastichus saundersi (Packard) HOWARD, in Scudder, Butterflies of Eastern United States, p. 1893, 1889.—VIERECK, Connecticut State Geol. and Nat. Hist. Surv. Bull. 22, p. 454, 1916.

The type, a male bred from a *Thecla* pupa, is in the Museum of Comparative Zoology.

TETRASTICHUS SEMIDEAE (Packard)

Eulophus semideae PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, p. 35, 1881.—HOWARD, U. S. Bur. Ent. Bull. 5, p. 46, 1885.—CRESSON, Synopsis of families and genera of Hymenoptera, . . . , p. 244, 1887.

Tetrastichus semideae (Packard) HOWARD, in Scudder, Butterflies of Eastern United States, p. 1893, 1889.—VIERECK, Connecticut State Geol. and Nat. Hist. Survey Bull. 22, p. 453, 1916.

The types, male and female, are in the Museum of Comparative Zoology. These type specimens were reared from pupae of the White Mountain butterfly, *Oeneis semidea* (Say), in New Hampshire.

TETRASTICHUS STANFORDIENSIS Fullaway

Tetrastichus stanfordiensis FULLAWAY, Journ. New York Ent. Soc., vol. 20, p. 281, 1912.

The single female type of this species cannot now be found. It was originally supposed to be in the collection of Stanford University, and bore the numbers Lot 497, sub. 8. It was reared from a pimply gall (possibly *Cynips douglasii* Ashmead) on California blue oak (*Quercus douglasii*); further rearing of material from this gall should yield specimens that could be placed under this name.

TETRASTICHUS THECLAE (Packard)

Eulophus theclae PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, p. 34, 1881.—HOWARD, U. S. Bur. Ent. Bull. 5, p. 46, 1885.—CRESSON, Synopsis of families and genera of Hymenoptera . . . , p. 244, 1887.

Tetrastichus theclae (Packard) HOWARD, in Scudder, Butterflies of Eastern United States, p. 1893, 1889.—VIERECK, Connecticut State Geol. and Nat. Hist. Survey Bull. 22, p. 454, 1916.

The type of this species, a male reared from a *Thecla* pupa, is in the Museum of Comparative Zoology.

TETRASTICHUS TRISULCATUS Provancher

Tetrastichus trisulcatus PROVANCHER, Additions et corrections à la faune hyménoptérologique . . . Canada, p. 211, 1887.—ROHWER and GAHAN, Can. Ent., vol. 50, p. 198, 1918.

The types are in the Harrington collection, Canadian National Museum, Ottawa, Ontario. In 1915, Mr. Gahan made the following notes from the type: "Apparently has but a single bristle on submarginal vein, . . . first funicle joint much longer than the pedicel (about twice), the funicle joints all nearly equal in length, the third very slightly shortest. Club not quite equal to second and third funicle combined. . . All femora black, tibiae pale."

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[Accepted names are in roman, synonyms in *italics*]

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